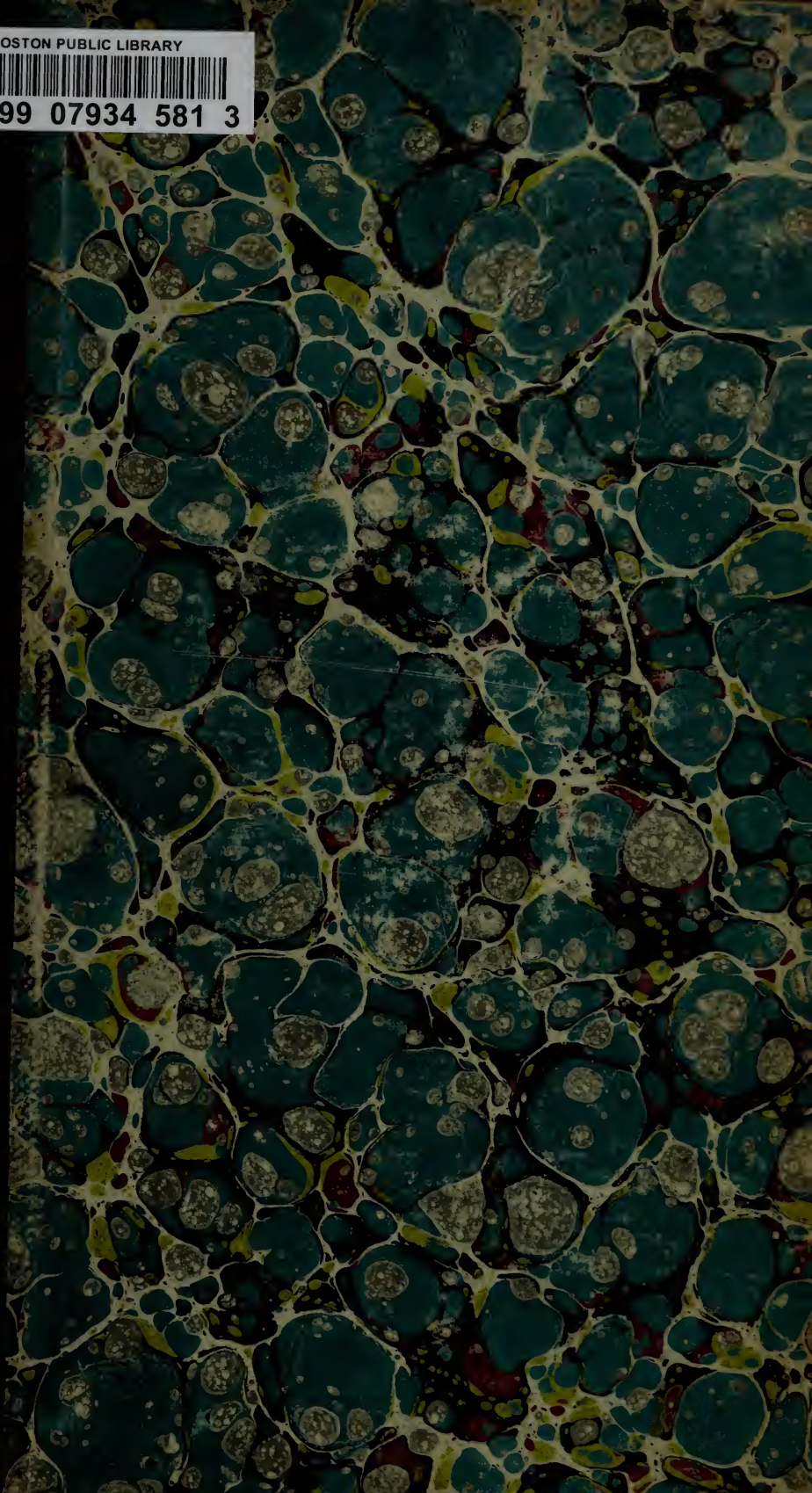


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Boston Schoolhouse Dept

THE ANNUAL REPORT OF
THE SCHOOLHOUSE
DEPARTMENT

FROM JULY 1, 1901, TO
JANUARY 31, 1902



BOSTON
MUNICIPAL PRINTING OFFICE
1902

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May 16 1903

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C O N T E N T S.

REPORT OF THE COMMISSIONERS.

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SCHOOLHOUSE DEPARTMENT.

Number of School Buildings in charge of this Department	306
Of this number not in use at present	5
Number of Hired Buildings	44
Giving Class-rooms to the number of	86
Number of Buildings under construction at the present time	7

REPORT OF THE COMMISSIONERS.

HON. PATRICK A. COLLINS,

Mayor of the City of Boston :

DEAR SIR, — In accordance with the provisions of chapter 473 of the Acts of 1901, the Board of Schoolhouse Commissioners submit herewith their first annual report. No report was made for the half year from July 1, 1901, to January 31, 1902, and this report covers the whole period during which the Board has been in existence.

I.

POWERS OF THE BOARD.

According to the Act creating this department (chapter 473 of the Acts of 1901) the Board exercises, subject to certain restrictions, all powers and authority with regard to taking of land, construction and furnishing of new school buildings, and the repairs and alterations of old school buildings.

In matters of planning and construction the Board act with the advice of the School Committee and the Superintendent of Schools, but do not require their approval.

In the selection of land for school purposes the Commissioners have sole authority, but the purchase of land is in the

hands of the Street Commissioners. In taking land the Street Commissioners are not allowed to purchase at a price more than 25 per cent. above the average of the assessed valuation for three years. This Board can request the Street Commissioners to acquire the property, either by purchase or by a taking, and the Street Commissioners are obliged to act accordingly. For land other than the increase of a lot they must advertise, but are not bound to the parcels offered.

It lies wholly with this Board, then, subject to the approval of the Mayor, to take final action as to the selection of land, the selection of architects, the character, accommodation, construction, finish, and equipment of new buildings, the laying out of grounds, the repairs and renewals of old buildings and the making of all contracts for this work.

At the time of the passage of this Act there was a great lack of school accommodation, owing to the fact that new buildings had not been erected, sufficient to meet the annual increase. All over the city children were in unsuitable rented quarters. The Board was obliged under the Act to determine before January, 1902, what new buildings were required, and what additions in old buildings or grounds were needed to accommodate the overflow existing at that time. This list was submitted to the School Committee December 18, 1901, and is as follows :

- Item 1. West End. — Phillips and Wells District. In the vicinity of Norman street, a large grammar and primary schoolhouse.
- “ 2. Roxbury. — Lowell District. In the vicinity of Heath and Day streets, a large grammar schoolhouse.
- “ 3. Roxbury. — Lowell District. A six-room addition to the present Wyman Primary Schoolhouse.
- “ 4. East Boston. — Emerson District. In the vicinity of Byron street, a primary schoolhouse.
- “ 5. Roxbury. — George Putnam District. In the vicinity of Atherton street, a primary schoolhouse.
- “ 6. Roxbury. — Martin District. In the vicinity of Francis street, a primary schoolhouse.
- “ 7. Dorchester. — Christopher Gibson District. In the vicinity of Bloomfield street (Dorchester Central), a primary schoolhouse.
- “ 8. Dorchester. — Roger Clap District. In the vicinity of Edward Everett square, a new grammar schoolhouse.

- Item 9. South End. — Addition to the Girls' High School site.
- " 10. Dorchester. — New district on old Gibson School site, South street, a large grammar schoolhouse.
- " 11. Charlestown. — New High School. The present lot to be enlarged.
- " 12. South Boston. — Lincoln District. Tuckerman site, corner of L and Fourth streets, a new primary schoolhouse.
- " 13. South Boston. — Gaston District. A six-room addition to the present grammar school building.
- " 14. South Boston. — Lincoln District. A four-room addition to the present grammar school building.
- " 15. North End. — Eliot and Hancock Districts. On present Ware School lot, North Bennet street, a large schoolhouse.
- " 16. Back Bay. — Prince District. Southwest of Massachusetts avenue, a grammar schoolhouse.
- " 17. Phillips Brooks District. A six-room addition to the present Howard avenue schoolhouse.
- " 18. Dorchester. — Edward Everett District. Savin Hill avenue, a two-room addition to the present primary schoolhouse.
- " 19. Mechanic Arts High Schoolhouse to be enlarged.
- " 20. Normal School. In the vicinity of Dudley Street Transfer Station.
- " 21. Girls' Latin School. In the vicinity of the Normal School.
- " 22. New district in the vicinity of Normal School, a grammar and primary schoolhouse.
- " 23. Roxbury. — Hugh O'Brien District. East of the present George street schoolhouse, a primary schoolhouse.
- " 24. Roxbury. — Lewis District. In the vicinity of Perrin street, a primary schoolhouse.
- " 25. Jamaica Plain. — Agassiz District. North of Forest Hills Station, a grammar schoolhouse.
- " 26. Dorchester. — Mather District. On Meeting House Hill School site, a grammar schoolhouse.
- " 27. Henry L. Pierce District. — In the vicinity of Bailey street, a primary schoolhouse.
- " 28. Dorchester. — Harvard street District. A primary schoolhouse.
- " 29. Dorchester. — Edward Everett District. In the vicinity of Savin Hill avenue, a primary schoolhouse.
- " 30. Washington Allston District. Present Brentwood street site, a grammar schoolhouse.

- Item 31. Roxbury. — Dillaway District. A four-room addition to the present grammar schoolhouse.
- “ 32. Roxbury. — Dillaway District. A four-room addition to the Bartlett street schoolhouse.
- “ 33. Roxbury. — Dudley District. A four-room addition to the present Dudley schoolhouse.
- “ 34. Roslindale. — Longfellow District. A new primary schoolhouse.
- “ 35. Dorchester. — Roger Wolcott District. Lauriat avenue District. A primary schoolhouse.
- “ 36. Roxbury. — Dearborn District. Replace the present Dearborn schoolhouse with a new grammar schoolhouse.
- “ 37. South Boston. — John A. Andrew District. Replace the present Ticknor schoolhouse with a new primary schoolhouse.
- “ 38. East Boston. — Lyman District. Replace the present Webb schoolhouse with a new primary schoolhouse.
- “ 39. West Roxbury. — Robert G. Shaw District. In the vicinity of Central Station, a primary schoolhouse.
- “ 40. Dudley District. A four-room addition to the present William Bacon schoolhouse.
- “ 41. East Boston. — Chapman District. An addition to the present grammar school lot.
- “ 42. North End. — Hancock District. An addition to the present Hancock School lot.

The following paragraph was annexed to the report:

“The Commissioners in submitting the foregoing having merely suggested in a general way the locations which seem desirable, but without attempting absolutely to fix them. As a particular instance of this we refer to the Normal and Girls' Latin Schools. While the Commissioners believe them to be necessary, they have as yet to determine definitely where they shall be located. We have not made any absolute decision in the matter, and the foregoing is subject to such revisions as may hereafter seem necessary.”

Furthermore, a report of the Board of Health, made to the School Committee in 1900 (Document No. 6), showed that many buildings were in an unsanitary condition, and a report from the Fire Commissioner made in 1900 (Document No. 16), showed that many were ill equipped with facilities for egress in case of fire.

II.

THE RESOURCES OF THE BOARD.

Under the provisions of chapter 400, Acts of 1898, as amended by chapter 448, Acts of 1901, the ordinary resources for school purposes are now \$3.40 on each one thousand dollars of the valuation on which the appropriations of the City Council are based. Of this, forty cents is for new buildings and twenty-five cents for repairs. The former amount, forty cents, would have been wholly inadequate to meet the emergency.

The Act establishing this department therefore provides for the issue of bonds during the year 1901 and the succeeding three years, to an amount not exceeding \$1,000,000 in each year. This was subsequently (chapter 386, Acts of 1902) increased to \$1,500,000 for 1902 and the two succeeding years. This amount is therefore solely for the purpose of making the buildings and the accommodation what they should have been on January 1, 1902, and does not purport to provide for the annual increase during the four years covered by the appropriation under the Act, which would normally be met by the forty cents on the tax rate.

Under this Act \$1,000,000 was appropriated in 1901, and \$1,000,000 in 1902, and later in the same year the additional \$500,000 permissible under the Act was appropriated.

III.

THE ORGANIZATION OF THE BOARD.

In accordance with the Act Mayor Hart appointed as Commissioners Frederic O. North for three years, John H. Colby for two years, and J. Payson Bradley for one year, from June 1, 1901. The Board organized June 24, with the election of J. Payson Bradley as Chairman and Horace B. Fisher as Secretary.

At the time of the passage of this Act the repairs and maintenance of schoolhouse property was in charge of a Schoolhouse Agent, under the direction of the School Committee. Almost the first act of the Board was to take on the office and working force of the Schoolhouse Agent. The Commissioners secured rooms in the building No. 276 Tremont street, previously occupied in part by the Schoolhouse Agent and his assistants, but the increase in work compelled them to seek larger quarters, and on May 1, 1902, they

moved to the Walker Building, 120 Boylston street. It is believed that they have now sufficient room to do properly the work of the department.

IV.

THE DUTIES OF THE BOARD.

The immediate duties of the Board in June, 1901, might be roughly classed under four heads:

1. To provide accommodation for the children then in rented quarters, and for the annual increase of children who would otherwise be without schools in the September following. (Referred to as *Accommodation.*)

2. To improve the existing sanitation, and provide proper facilities in case of fire in the older buildings. (Referred to as *Sanitation.*)

3. To do the ordinary repairs, and make good deficiencies of past years. (Referred to as *Repairs.*)

4. To complete and make ready for occupation the new buildings begun by the School Committee. (Referred to as *Completion.*)

These four heads will be considered in detail under "The Execution of the Work," in the following section:

V.

THE EXECUTION OF THE WORK.

(1.) ACCOMMODATION.

To provide accommodation, as it was evident that no permanent buildings could be erected in the two months before school opened, the Board decided, rather than make the attempt to hire quarters, to build portable schools, one-story buildings, capable of containing fifty children each, and so constructed as to make it a simple matter to take them apart, move and erect them elsewhere as occasion might arise. Forty-nine such buildings were erected in the summer of 1901 and thirty-two in the summer of 1902. They are wooden buildings, and highly undesirable in thickly populated districts; and it is hoped that the permanent buildings to be completed in the autumn of 1903 may make further "portables" unnecessary.

The immediate needs thus provided for, the Board was ready to proceed to the erection of new buildings, but were of the opinion that they ought not to proceed therewith until

action had been taken by the School Committee, as appears in the following communication from this department to the committee :

CITY OF BOSTON,
OFFICE OF SCHOOLHOUSE DEPARTMENT,
276 TREMONT STREET,
BOSTON, November 11, 1901.

To the School Committee, City of Boston :

The Act of the Legislature establishing the Schoolhouse Department, after making provision for the organization of the department and setting forth its powers and duties in a general way, provides that the Board shall, in addition to its other duties, "as speedily as possible, request the Street Commissioners to take land for, and shall construct and furnish, and prepare yards for, such Normal and other new buildings as prior to the year 1902 shall be determined by said Board to be required at that date, for the accommodation of school children, in addition to the school buildings heretofore contracted for . . .," but the Act further provides, "nor shall said Board request the Street Commissioners to take any land except within the limits of a school district, which shall first be designated by the School Committee . . .". This latter provision, which in effect states that the School Committee shall first designate the districts within which new schoolhouses are to be located, prevents this department from proceeding with new buildings until your committee sees fit to take the matter up.

This department has now been in existence about four months, and the Commissioners have in that time, to the best of their ability, organized it to do all the work devolving on the department, but up to the present time we have been obliged to confine our efforts entirely to the matters of repairs and sanitation on old buildings and providing temporary accommodations. We are impressed with the serious fact that there are to-day a very large number of children housed in rented quarters and in portable buildings, and that before any considerable number of new buildings can be completed the situation will be much worse than it is at the present time. The citizens have evidently expected that this department would meet this issue of providing adequate and permanent school accommodations fairly and at an early date. Under the terms of the Act creating this department, this work must all be blocked out within the next fifty days, but we find ourselves powerless to act in the premises, and while we have no desire to interfere with the workings of the School Committee, we feel it right that we should call your attention to the fact that we cannot proceed with this work, as was intended, until your committee shall have taken the initiative, as was contemplated by this Act. Although your committee must be even more familiar with the situation than are we, and the present necessity for new schoolhouses, still we desire to impress upon you anew the

importance of speedy action, and we most respectfully request your committee to designate at the earliest possible time the districts within which, in your opinion, these new schoolhouses should be located.

Respectfully,

J. PAYSON BRADLEY,

Chairman Schoolhouse Commission.

But, as no action was taken thereon by the committee, and as the Commissioners were, as before stated, obliged to determine before January, 1902, what new buildings were required, the list submitted to the committee December 18, 1901, was prepared.

The Board decided to take up the following eight items, and, that all might proceed at once and as rapidly as possible, entrusted the work to eight architects.

Item 7.* A primary building in the Christopher Gibson District. Land for this was purchased on Westville street, an area of 30,370 square feet, for which \$9,111 was paid. Messrs. Maginnis, Walsh & Sullivan were appointed architects, and they planned a fifteen-room building, with one large and two small kindergartens, basement play-rooms and ample playgrounds. The building was let on a single contract for \$122,178, and is under forfeit to be finished July 31, 1903.

Item 8. A large grammar school in the Roger Clap District. Land was taken on Columbia road, an area of 50,075 square feet, for which \$26,750 was paid. Mr. James Mulcahy was appointed the architect, and prepared plans for an eighteen-room building, with cooking school and manual-training room, an assembly hall, basement play-rooms, playgrounds on the rear, and graded and planted grounds on the front. The building was let in four contracts aggregating \$183,878. The general contractor is under forfeit to finish August 25, 1903.

Item 1. A grammar and primary building in the Phillips District. For this land was purchased on Norman street, an area of 24,889 square feet, the price of which is not yet settled. The land was taken by eminent domain, as it could not be bought at a figure 25 per cent. above the assessed valuation. Messrs. Everett & Mead were appointed architects, who planned a building containing thirty class-rooms, manual-training room and cooking school, a ground-floor hall or play-room, small yards, and a roof playground. The building was let in four contracts aggregating \$319,720, and is to be completed February 6, 1904.

* The numbers refer to the list of December 18, 1901, as given on page 2.

Item 6. A primary school in the Martin District. Land was bought on Huntington avenue and Kenwood road, an area of 27,923 square feet, for which the Board paid \$36,300. Messrs. Wheelwright & Haven were appointed the architects, and prepared plans for a twelve-room building, with a cooking-room and a manual-training room, two play-rooms and a playground. The building was let in four contracts for the sum of \$148,761, and is to be finished, under a forfeiture clause, October 31, 1903.

Item 4. A primary school in the Emerson District. Land was bought for this on Horace and Byron streets, East Boston, an area of 17,500 square feet, for which the Commissioners paid \$12,050. Messrs. Whitman & Hood were appointed the architects, and made plans for an eleven-room school building, with cooking school, manual-training room, play-rooms and playground. The building was let in four contracts for the sum of \$122,916, and is to be completed about September 7, 1903.

Item 2. A grammar school in the Lowell District. Land for this school was purchased on Heath street, an area of 38,215 square feet, for which the Commissioners paid \$22,940.33. Messrs. Shepley, Rutan & Coolidge were appointed the architects. They made plans for a building containing nineteen class-rooms, cooking school and manual-training room, a hall, play-rooms and playgrounds, and a sodded and planted fore-court on the street. The building is let in four contracts for \$214,065, and is to be completed about February 1, 1904.

Item 5. A primary building in the George Putnam District. Land for this was bought on School street, West Roxbury, an area of 35,941 square feet, for which \$13,841.49 was paid. Messrs. Andrews, Jaques & Rantoul were appointed architects, and prepared plans for a twelve-room building with basement play-rooms, playgrounds, and a large planted area to the south and east. The building is let in four contracts for \$122,056, and is to be completed about February 1, 1904.

Item 9. The addition to the Girls' High School, with gymnasium, etc., was given to Messrs. Wales & Holt to design, but on finding that other needs were more pressing, it was, with the approval of the Principal, postponed, but the land was taken.

In all these buildings there has been great delay in getting the drawings ready for contracts, due in large part to the Commissioners being unfamiliar with the work, and finding no standard among the existing buildings which could be safely followed, nor any settled policy in the School Committee.

This standard they have sought to establish, and the School Committee have in a measure settled a policy, so that there is now some uniformity of requirements and of construction in schools of the same grade. To accomplish this many changes were necessary in the plans submitted, and the Commissioners wish to take this opportunity of acknowledging their indebtedness to the architects who have thus worked for them, redrawing and correcting completed drawings and rewriting specifications. They feel that a distinct step has been made in the direction of a standard of excellence and uniformity, and that in the future the work will be much simplified.

During the summer of 1902 the Commissioners began the consideration of further work, and the Superintendent of Schools being away and the Committee on School Houses holding no meetings during the summer, they followed the general lines laid down by the Committee on School Houses and completed certain purchases already contemplated or approved.

Item 41. Land for an addition to the present Chapman Grammar Schoolhouse, an area of 8,650 square feet, was taken, but the price is not yet adjusted.

Item 42. Land for an addition to the present Hancock School lot, an area of 2,263 square feet, was taken, for which \$22,500 was paid.

Item 34. Modified to mean an extension of the Longfellow School. To accommodate this the Commissioners bought land of an area of 8,923 square feet. Messrs. Walker & Howe were appointed architects, and plans are being prepared for the addition.

Item 15. Land was taken enlarging the Ware lot in the Eliot and Hancock Districts, an area of 6,419 square feet, the price of which is not yet adjusted. The total area now available here (Ware lot and addition) is 12,858 square feet. The Commissioners appointed Messrs. Winslow & Bigelow the architects of the new building on the Ware lot, and gave them the instructions of the Committee on School Houses as to accommodation. The building is to contain twenty-two rooms, a small hall, play-rooms, and new sanitary for the Eliot School.

Item 11. The Commissioners took land, enlarging the Charlestown High School lot, an area of 2,878 square feet. The total area here available is 16,380 square feet.

Item 19. The Commissioners took steps toward the enlargement of the Mechanic Arts High School. This problem requiring study before the land was purchased, the Board

appointed Messrs. Wheelwright & Haven, who built the present building, to be the architects. The addition to the Mechanic Arts High is to accommodate the academic part of the school, and is to contain class-rooms for 1,200 pupils, a hall, chemical and physical laboratories, a lecture-room, lockers, and lunch-rooms.

(2.) SANITATION.

The second purpose for which the large appropriation was given was for the improvement of the sanitary condition of the old buildings and for decreasing the fire risks. Thirty-one schools have been supplied with modern plumbing, replacing dry vaults, flush vaults, and defective plumbing. After consultation with the various authorities, in the light of the experience of others elsewhere, the Commissioners are inclined to favor, for closets in primaries and grammars, the type known as latrines, a trough of porcelain or porcelain-lined enamel, each section vented, the whole flushed automatically with a large body of water; a slate partition between the sections, either with or without half-doors, as may in each case seem best. A short-hopper closet with full or half-bend cast-iron and large local ventilation has also been found very satisfactory and no more expensive. In high schools, and also for masters' and teachers' toilets, a good wash-down closet is found most suitable; for urinals, slate floor, trough, and back slab and local ventilation. In primaries, partitions making stalls may be omitted for greater facility in cleaning, but in schools of higher grade they may be desirable. Slate sinks are preferable to porcelain, and stream drinking-fountains placed in the corners promise a satisfactory supply of drinking water, which is more important than facility for washing.

All this work is based on a carefully drawn uniform specification, which allows all the chief manufacturers to compete on equal terms. This work of renewing sanitation is going steadily forward on the lines laid down by the report of the Board of Health.

In the following schools new sanitation, plumbing, etc., were installed, as noted below :

AUBURN SCHOOL. Four-room primary building, Washington Allston District — one set of 4, one set of 6, porcelain latrines, 10 feet slate urinals, new plumbing throughout, yard drainage, 4 catch-basins, removal of old vault in yard; cost \$4,302.63, finished in September, 1902.

ATHERTON SCHOOL. Eight-room primary building, Christopher Gibson District — 4 new slate sinks, 2 galvanized sinks, 2 cess-pools in yard, 1 water-closet, 1 lavatory bowl, new drain from foundation wall throughout building into yard, new water pipes; cost \$2,708, finished in December, 1901. Twenty-two short-hopper closets, removal of Fuller & Warren cremating system closets, new plumbing throughout; cost \$3,477.16, finished in September, 1902.

ADAMS SCHOOL. Thirteen-room grammar building — a complete rearrangement of heating and ventilation with slight changes in sanitation incident thereto; cost \$10,065.95, finished in October, 1902.

AARON DAVIS SCHOOL. Twelve-room primary building, Dearborn District — 26 wash-down closets, 18 feet slate urinals, yard drainage, 4 catch-basins, removal of old vault in yard, new plumbing throughout; cost \$6,933.93, finished in July, 1902.

BENNETT SCHOOL AND BENNETT ANNEX. Seven-room grammar and six-room primary buildings — 42 wash-down closets, 55 feet slate urinals, yard drainage, 4 catch-basins, new plumbing throughout, removal of old flush vaults; cost \$17,582.29, finished in October, 1902.

CHARLES C. PERKINS SCHOOL. Eight-room primary building, Prince District — 25 short-hopper closets, 37 feet slate urinals, removal of Fuller & Warren cremating system closets, new plumbing throughout; cost \$5,458.48, finished in October, 1902.

COOK SCHOOL. Six-room primary building, Franklin District — 1 wash-down closet, partly new plumbing, new furnace-room, furnace pipes, cold-air box, new stairs etc.; cost \$1,766.95, finished in August, 1902.

DRAKE SCHOOL. Six-room primary building, Norcross District — 2 wash-down closets, 10 iron latrines, yard drainage, 2 catch-basins, removal of old flush vault in yard, new plumbing throughout; cost \$3,655.94, finished in October, 1902.

DUDLEY SCHOOL. New water supplies through basement, 20 valves and ball-cocks for pupils' closets, seat attachments removed; cost \$660, completed in September, 1901.

DWIGHT SCHOOL. Fourteen-room grammar building — 26 wash-down closets, 54 feet slate urinals, new plumbing throughout, yard drainage, 2 catch-basins, removal of old flush vault in yard; cost \$7,542.91, finished in October, 1902.

ENGLISH HIGH AND LATIN SCHOOLS. Three new soapstone troughs, 4 soapstone sinks, new waste and supply pipes throughout, new chemical-room; cost \$1,923, finished in September, 1901.

EMERSON SCHOOL. Six-room primary building, Wells District — 1 wash-down, 14 short-hopper closets, 16 feet slate urinals, new plumbing throughout, 2 catch-basins, removal of flush vaults in yard; cost \$5,297.35, finished in September, 1902.

EVERETT SCHOOL. Fourteen-room grammar building — 31 wash-down closets, yard drainage, 6 catch-basins, new plumbing throughout, removal of flush vault in basement; cost \$7,165.51, finished in June, 1902.

FRANCIS PARKMAN SCHOOL. Four-room primary school, Agassiz District — seat attachments removed in closets in basement, new valves with chains and pulls put in; cost \$115, finished in September, 1901.

FREEMAN SCHOOL. Six-room primary building, Eliot District — new plumbing laid out and advertised, but work postponed until summer at the request of the Superintendent.

FLORENCE SCHOOL. Six-room primary building, Charles Sumner District — new plumbing throughout, 2 wash-down closets, 11 iron latrines, 16 feet slate urinals, removal of Fuller & Warren cremating system closets, unfinished; contract price, \$4,479.

GEORGE PUTNAM SCHOOL. Ten-room grammar building — new plumbing throughout, 25 wash-down closets, 19½ feet slate urinals, yard drainage, 2 catch-basins, removal of vault in basement; cost \$14,262.01, finished in April, 1902.

GRANT SCHOOL. Four-room primary building, Phillips District — 1 wash-down closet, 4 iron latrines, 12 feet slate urinals, yard drainage, 3 catch-basins, new plumbing throughout; cost \$3,887.31, finished in September, 1902.

HARVARD SCHOOL. Fourteen-room grammar building — new plumbing throughout, 2 wash-down closets, 21 short-hopper closets, yard drainage, 3 catch-basins, removal of long-hoppers, earthen drains; cost \$7,270.67, finished in November, 1902.

HORACE MANN SCHOOL. Seventeen new water-closets and piping for same, local ventilation by electric fans, 2 cesspool traps; cost \$1,990, finished in September, 1901.

HUGH O'BRIEN SCHOOL. Fourteen-room grammar building — new 2-inch water-main from street to drum in boiler-room, new valves and one 1-inch line of pipe to top floor for sinks; cost \$361, finished in September, 1901.

IRA ALLEN SCHOOL. Six-room primary building, Sherwin District — drains rearranged and carried out into different streets, 3 catch-basins; cost \$2,745.05, finished in December, 1902.

LEWIS SCHOOL. Twelve-room grammar building — new 1½-inch water-main from street into sanitaries, new piping throughout basement; cost \$590, finished in September, 1901; also 30 new ball-cocks and valves, seat attachments removed, new supply to furnaces; cost \$325, finished in November, 1901.

LOWELL SCHOOL. Fourteen-room grammar building — shower baths, etc.; cost \$1,310.03, finished in August, 1902.

MAYHEW SCHOOL. Fourteen-room primary building, Wells District — putting in new cold-water supplies throughout building, and changing drain system, carrying same into Poplar street; cost \$1,917.07, finished in June, 1902.

NORCROSS SCHOOL. Fourteen-room grammar building — new plumbing throughout, 31 wash-down closets, yard drainage, 2 catch-basins, removal of old vault in yard; cost \$14,601.31, finished in June, 1902.

OLD GIBSON SCHOOL. Six-room primary building — new iron drain from foundation wall throughout basement draining Fuller & Warren system, and out through roof; cost \$871.25, finished in October, 1901.

PHILLIPS BROOKS SCHOOL. Fifteen-room grammar building — ventilation from toilet-rooms in basement; cost \$490, finished in April, 1902.

PARKMAN SCHOOL. Twelve-room primary school — 2 wash-down closets, 12 iron latrines, 31 feet slate urinals, yard drainage, 4 catch-basins, removal of old vault in yard, practically new plumbing throughout; cost \$7,111.33, finished in November, 1902.

QUINCY SCHOOL. Fourteen-room grammar school — practically new plumbing throughout, 16 wash-down closets, 56 feet slate urinals, yard drainage, 2 catch-basins, removal of vault in yard; cost \$10,173.73, finished in October, 1902.

ROGER CLAP SCHOOL. Ten-room grammar building — 4 new catch-basins in yard, new iron drain from same, yard repaved; cost \$913, finished in September, 1901. Also new iron drain from foundation wall to sewer, with trap and brick manhole; cost \$458; finished in November, 1901.

ROXBURY HIGH SCHOOL. Nineteen-room high school building — new ball-cocks throughout building, hot water to master's and teachers' rooms, and repairs to water-closets, wash-bowls and sinks; cost \$504, finished in May, 1902. Also removal of old plumbing system in chemical laboratory and installation of new system; unfinished; contract price, \$8,090.

RUTLAND STREET SCHOOL. Six-room primary building, Dwight District — 16 wash-down closets, 14 feet slate urinals, yard drainage, 4 catch-basins, practically new plumbing throughout, removal of vault in yard; cost \$6,026.43, finished in March, 1902.

SAVIN HILL SCHOOL. Two-room primary school, increased to a four-room building, Edward Everett District — 3 sinks, 1 cellar drainer, installation of plumbing system incident to enlargement of building; cost \$7,876.27, finished in October, 1902.

SHERWIN SCHOOL. Sixteen-room grammar building — 3 wash-down closets, 22 short hopper-closets, 74 feet slate urinals, practically new plumbing throughout, yard drainage, 4 catch-basins, removal of vault and urinals in basement; cost \$8,966.43, finished in October, 1902.

SKINNER SCHOOL. Six-room primary school, Brimmer District — 16 porcelain latrines, 12 feet slate urinals, new plumbing throughout, yard drainage, 2 catch-basins, removal of vault in yard; cost \$5,222.68, finished in September, 1902.

SMITH STREET SCHOOL. Kindergarten building, Comins District — 1 new water-closet, piping for same, sheathe walls and

ceilings of toilet-room, cementing entire cellar, removal of old outhouse in yard; cost \$375.20, finished in September, 1901.

TYLER STREET SCHOOL. Six-room primary building, Winthrop District—1 wash-down closet, 12 iron latrines, 14 feet slate urinals, yard drainage, 3 catch-basins, new plumbing throughout, removal of vault in basement; cost \$4,663.91, finished in September, 1902.

WAIT SCHOOL. Eight-room primary building, Franklin District—vaults in basement removed and entire plumbing removed throughout building, new building erected in yard, and closets and urinals located in same, new plumbing throughout, 18 wash-down closets, 14½ feet of urinal, 6 catch-basins, 2 furnaces; cost \$9,999.23, finished in January, 1902.

WAY STREET SCHOOL. Three-room primary building, Quincy District—new plumbing throughout, 1 wash-down closet, 10 short-hopper closets, 10½ feet slate urinal, yard drainage, 1 catch-basin, removal of iron latrines and slate trough urinal, new iron stairs, electric light and general repairs; cost \$7,124.11, finished in November, 1902.

WELLS SCHOOL. Twelve-room grammar building—3 wash-down closets, 24 short-hopper closets, yard drainage, 3 catch-basins, new plumbing throughout; unfinished; contract price, \$7,306.

WINTHROP SCHOOL. Fourteen-room grammar school—new water-closet for janitor's use, drain from same, 3-inch vent through roof; cost \$288, finished in September, 1902.

NOTE.—In some cases the new sanitation was in the basement, in others a separate outside building was erected for its accommodation. In all cases the prices given are the total cost of the work, including all trades. A date for completion was fixed in most cases and a forfeit and bonus clause enforced; under this most of the work was done at one time; some was finished before time and a bonus paid, some was delayed overtime and a forfeit exacted.

In the following schoolhouses fire-escapes have been erected:

COOK SCHOOL.

Primary Building, Franklin District.

FRANKLIN SCHOOL.

Grammar Building, Waltham street.

HILLSIDE SCHOOL.

Primary Building, Bowditch District.

All this work, on new buildings, new sanitation, and for fire protection, is chargeable against the appropriations, which,

for 1901-1902, aggregated \$2,500,000. These appropriations will, in the opinion of the Commissioners, undoubtedly be sufficient to pay for both the work already completed and contracted for and leave a balance sufficient to cover the cost of land, No. 15 (Eliot and Ware) and No. 19 (land for Mechanic Arts High School addition).

There is a great deal of work the need for which is imperative. The Normal School is in wholly unsuitable quarters. The Girls' Latin is in expensive rented quarters. The outlying districts are growing so rapidly that in many places accommodation is entirely inadequate, and the wooden portables are an undesirable makeshift for permanent quarters. Under these circumstances the Commissioners urge that the appropriation for 1903 be the full amount provided for by the Act.

For a more detailed statement of the new buildings and the work of installing new plumbing, see "Notes on New Buildings" (Appendix I.) and "Description of New Sanitation" (Appendix II.).

(3.) REPAIRS.

In June, 1901, the Commissioners attempted to lay out a schedule of the repairs most needed, and estimated the cost at \$220,000. Under the appropriation of 25 cents per \$1,000 for repairs, \$261,718.86 was available in 1901, but of this amount the sum of \$260,400 was appropriated by the School Committee. Of this latter amount, \$152,445.79 was expended by the Committee on New Buildings (which at that time had charge both of construction and of repairs), in the first six months, leaving the Board \$134,797.20 for the remaining six months, and the ordinary repairs call for an expenditure of about \$10,000 to \$12,000 per month. Under these circumstances, much that should have been done during the summer of 1901 was postponed, thus adding to the burdens of the next summer, when, in the short period of about two months, the bulk of the repairs had to be done. The amount for 1902 was \$277,059.81, and this would have been quite inadequate but for the fact that \$50,000 of the appropriation for Land and Buildings for schools was used to cover the cost of cleaning and whitewashing, which seemed a sanitary necessity rather than an ordinary repair, and the fact that the shutting off of the heat in the Christmas holidays postponed work which was arranged for that season.

It would be impossible to attempt to schedule the work done under the head of repairs. Many of the older but

fairly good school buildings had been neglected, especially externally, for years; and as the funds (in many cases) would not allow of repairs within as well as without, it was considered more important to make walls and roofs tight and to repair and paint outside woodwork. There was much repairing to be done on heating plants which could not be postponed. The most important of these items were new boilers in the Roger Clap, the English High, the Girls' High, the Brighton High, and new heating and ventilating plants in the Adams School. These items alone cost \$33,488.99. Of the total number of 214 schools, not including portables, there were special repairs on 202 to an amount of over \$150 each, and the portables of 1901 were in most cases painted again. Besides these repairs there was a mass of petty repairs which were of daily occurrence. Very much still remains to put the schools in good condition, and until this is done no reduction in the appropriation for repairs would be desirable.

(4.) COMPLETION.

Under the Act creating this department the School Committee were given the option of completing the buildings then in process of construction, or turning them over to this department for completion; and not until February 11, 1902, were these matters turned over to this department, when the School Committee voted: "That all unfinished matters in connection with the taking of land, the erection and furnishing of buildings, and the preparation of yards, now in charge of the School Committee, including the expenditure of the unexpended balance of appropriations heretofore made, now available for such purposes, are hereby transferred to the Board of Schoolhouse Commissioners, in accordance with section 6, chapter 473 of the Acts of 1901."

The unexpended balance of appropriations so transferred amounted to \$206,290.35, but the outstanding obligations were substantially of the same amount, and there were still many things in connection with the buildings unprovided for. The principal buildings, thus turned over incomplete, were the South Boston High, the Dorchester High, the Ira Allen, the Roger Wolcott, the Winship, the Chapman and the Bigelow Schools; in some cases merely the grounds, in others their equipments, were incomplete. The additional money necessary for the completion of these buildings had to come out of the appropriation made by the School Committee for new buildings, and of about \$446,000, that might have been appropriated for new schoolhouses,

\$90,000 was appropriated, it being supposed at the time that this amount would be sufficient, with the unexpended balance received from the School Committee, entirely to finish up and complete the buildings in question; but as a matter of fact a further appropriation will be needed for this same purpose.

The buildings to be completed were as follows:

1. The South Boston High School. Readjustment of the ventilation, not designed to operate except when the boilers were running; the grading and planting of the grounds; petty repairs in the building, due to various causes, but largely to the many delays in construction. This work has been partly finished. The grounds in front have been drained, graded, and planted at a cost of \$7,837.40, and plans made for the treatment of the grounds in the rear in connection with the monument.

Between the school and the monument on Dorchester Heights there were the remains of the stone-lined wall of the old reservoir. The opportunity to make a fine approach to the monument from the school grounds, and at the same time to increase the area available for the school, was exceptional. The matter has been brought to the attention of the Mayor and the Governor; and the Superintendent of Public Grounds has also given his hearty co-operation. The architects of the school and of the monument, Mr. Hale and Messrs. Peabody and Stearns, have jointly made a scheme for this work, and it is hoped that the funds will be available for completing it.

2. The Dorchester High School. Plans have been made for the grounds about the school, but before a satisfactory scheme was reached the small balance remaining of the \$90,000 appropriation and the lateness of the season made it undesirable to go on with the work. Beyond petty repairs, no money has been expended here.

3. The Ira Allen School. The yard was ungraded and the portion to be occupied by an addition in a dangerous condition, making grading necessary. A new, deeper sewer near the school made it desirable to change the sewer connection. The grading and the sewer connection have been done (chargeable to the second appropriation), at a cost of \$2,745.05.

4. The Roger Wolcott School. Of the extensive grounds of this school no portion was graded, and plans were made for yards at the rear, and a low fence, hedge and lawn, with trees on the front. This work has been contracted for at a cost

of \$7,791, but is not yet complete. Occupancy developed troubles in the heating and ventilating plant, somewhat like those at the South Boston High School. Some of these have been remedied. It was found that the roof had been constructed in technical violation of the buildings laws, and the Commissioners were obliged to expend, for making such alterations as would conform to the requirements of the Building Department, \$420.75.

5. The Winship School. The yards were not graded nor asphalted, but the front was finished with a wall and fences. Unfortunately the street had been laid out by the Board of Survey to be lowered in places nearly four feet. The Commissioners were obliged to remove the fence and re-grade the front and hedge it. The yards were paved, and the whole of the work done at a cost of \$3,510.50. There was the same trouble with the roof as in the Roger Wolcott School, which the Commissioners were obliged to make good.

6. The Chapman School. The School Committee contemplated taking more land for yards, and no grading had been done. The Commissioners have taken the land, as previously stated, but the ground is not yet cleared.

7. The Bigelow School was like the Chapman School. The Commissioners finished the grading and paving about the building as it stood at a cost of \$2,306, and then bought the additional land, but have not as yet graded or paved this portion. As in the Roger Wolcott and the South Boston High schools, there has been difficulty with the heating plant. Certain more obvious defects in workmanship have been made good by the contractors, Messrs. Lynch & Woodward. More radical defects in the system have been remedied at a cost of about \$800.

The difficulty in fixing the responsibility for bad workmanship or serious defects in many cases delayed the execution of repairs. In two cases the contractors had failed. In nearly all cases, the South Boston High, the East Boston High, the Bigelow, the Winship, and the Ira Allen Schools, there were claims for damages for delay on the part of the contractor, and this notwithstanding that the contracts had forfeiture clauses which were never formally released and that in some cases the contractors received special accommodation in their payments. In the South Boston High and the East Boston High the awards for delay were made by the architects and allowed by the Committee on New Buildings. These amounts were as follows: South Boston High, \$11,522.60; East Boston High, \$9,200.39. In each of these cases, and in that of the Dorchester High School, the

architect also made claim for extra compensation. The claims on the South Boston High and the Dorchester High were allowed by the Committee on New Buildings and paid later by this Board. Suit was brought by the architect of the East Boston High for the sum of \$8,175, but this suit was settled for \$3,300. After the settlement of these claims similar ones were made on the Bigelow, the Winship, and the Ira Allen Schools. The School Committee denied that there was any ground for a claim; but the architects of the Bigelow and Winship approved the contractors' claims; the Law Department advised the Commissioners that under the contract the architect was sole judge. These claims were therefore paid, and the architects then claimed extra compensation for their services. In the case of the Ira Allen, the architect refusing to serve, he was discharged, and Professor Chandler appointed in his place. He found that the contractors had no claim and would award no damages. The amount for delay awarded to contractors and architects on these schoolhouses were as follows:

SCHOOLHOUSES.	TO CONTRACTORS.	TO ARCHITECTS.
Dorchester High . . .		\$2,000 00
South Boston High . . .	\$11,522 60	1,900 00
East Boston High . . .	9,200 39	3,300 00
Bigelow	3,025 00	
Winship	5,266 02	665 95

In connection with the amounts that were paid on the Roger Wolcott and the Winship schools, to make good obvious violations of the building laws, the Commissioners are inclined to think that architects working for the City of Boston should be responsible for any expense in which they involve the city through non-compliance with the definite building laws of the city.

VI.

FURTHER WORK OF THE BOARD.

Colonel J. Payson Bradley, who was elected Chairman of the Board on its organization, found it would be impossible for him to serve out more than the year for which he was appointed, and, in fact, very difficult to do even that; and feeling under the circumstances that his successor ought to familiarize himself with the department, particularly with reference to the new buildings, as soon as possible, sent in his resignation to Mayor Collins, which was accepted as of May 1, 1902, and on the same day Mr. R. Clipston Sturgis

was appointed to serve out his unexpired term, and was elected chairman for the balance of the year.

Colonel Bradley approached the arduous duties of his position with his well-known enthusiasm and singleness of purpose, and by his uniform courteous and untiring efforts secured the esteem of his associates, his subordinates, and all those who had business with the office. His enforced withdrawal was received with sincere regret.

VII.

REPORT OF COMMISSIONERS' INVESTIGATION IN OTHER CITIES.

Between the 9th and 24th days of October, 1901, the Commissioners visited New York, Philadelphia, Washington, Chicago, Toledo, St. Louis, Cleveland, Buffalo, and Rochester for the purpose of examining their school buildings; and, while a detailed account of the trip will be found in Appendix VII., the Commissioners desire to put in concrete form the general conclusions which they drew from this trip, and which are therefore embodied in the following paragraphs.

As to schoolhouse lots, it is desirable, when the value of the land permits, to take sufficient ground to have playgrounds about the building. When it is not possible to have ample playgrounds, it is necessary to make provision for this in the building, either by setting aside the basement floor for this purpose, or by utilizing the roof as a garden, or by a combination of these two plans.

The best building material seems to be red brick. The buildings should be of fireproof construction, and this is being adopted in every city where it is felt that the finances will warrant it. Wooden floors in corridors are not desirable; either terrazzo, cement, or rock asphalt are preferable. The tendency is toward wider corridors.

The school-rooms should have wooden floors, maple being in every way satisfactory. It is better to have the class-rooms lighted from one side, although some authorities, notably those of Cleveland, do not believe in it. There should be separate rooms for the children's clothing, with entrances from the class-rooms rather than from the corridors. The school-room doors should contain plain glass panels, in order that the master, when passing through the building, may have a general oversight of the school without actually opening the doors. Painted burlap for dados, both in corridors and class-rooms, has the unqualified support of

the authorities in Chicago and St. Louis, where it is used extensively. It is found advantageous to omit all thresholds.

Stairways are generally being built of iron with treads of wood, slate, marble, North River stone, or asphalt. The two latter are preferable to the others, in our opinion. Teachers' retiring rooms are provided in all modern school buildings. Both bookcases and teachers' closets should be built into the rooms.

The sanitariums should have asphalt floors. The walls should be either painted or of enamelled brick. Latrines are used very extensively outside of Boston, and might well be used in any of the primary schools in Boston, and possibly in some of the grammar schools. The tendency is to do away with high partitions and in many cases to omit doors.

The twin stairway in New York is particularly interesting and worthy of use when circumstances permit. We found that Boston was doing more in the way of gymnasias and bath facilities than any other city, with the possible exception of New York. Assembly halls, in grammar schools at least, are not a general feature in schoolhouse construction, but in many places a system of sliding partitions is employed so that the whole or a greater part of a single floor can be thrown into one room.

The type of school furniture used in Boston, namely the individual desk and chair, we found nowhere else, except in Washington. It should be said that the Boston type was approved by those with whom we talked, the claim being made that it was not used on account of the increased expense.

Telephone systems connecting the master's room with the various rooms in the building, while adopted in Boston, were not found in any other city. In New York, a system of speaking tubes is used, and even that was not considered absolutely necessary. The use of platforms in class-rooms has been practically abandoned.

In many places tilings are used, both in corridors and in class-rooms, but not with very great success. Quite extensive use is made of stamped-steel ceilings.

The ventilating systems are almost as various as the styles of schoolhouse architecture. The general tendency seems to be to use the blower or plenum system either absolutely or in connection with the gravity system. In many places where an elaborate fan system is in use, it is not operated except when steam is carried in the boilers for heating purposes.

From the standpoint of economical and satisfactory construction, it is desirable to complete schoolhouses under as few contracts as possible. In most places the janitors are called upon to make all the ordinary repairs. In some places they do the general work of cleaning furniture. To obtain satisfactory results, the janitors' service should be under the control of those having charge of the repairs on the buildings.

VIII.

THE POLICY OF THE BOARD IN MATTERS OF CONSTRUCTION AND EQUIPMENT.

Since the time of Mr. Wheelright's tenure of the office of City Architect there has been a great lack of uniformity in the schools of Boston, and a general tendency to more elaborate plans, varying according to the taste of the architect, the wishes of the master, or the influence of individuals in the School Committee. Besides mere matters of ornamentation there have been constantly increasing demands in the way of additional features, gymnasia, baths, kindergartens, cooking rooms, wood-working rooms, and facilities for evening work. The demand for these things in new buildings has also led to the attempt to provide them for the older buildings.

There is, no doubt, a popular demand for a more extended use of the school buildings and yards. This necessitates the installation of increased lighting facilities, an increased use of the heating and ventilating apparatus, and in many cases the installation of baths and gymnasia. The Commissioners personally believe that this may be a wise movement, but one that should be understood fairly by the citizens, and provision be made for meeting the increased expenses thereby made necessary.

Since the total amount which the School Committee is to receive, under present circumstances, for the support of the public schools is \$3.40 on a thousand, of which 65 cents is disposed of for repairs and current growth, any increase in the charges for maintenance will result in decreasing teachers' salaries, to say nothing of the demand upon this board for money out of the 65 cents for providing these additional facilities. It may be a question whether or no the matter of baths should not be left largely to the Bath Department, and the question of gymnasia to the Park Department.

The Board has taken the ground that many of these questions, with reference to the actual physical requirements of

the buildings, should be passed upon by the School Committee, and to that end a communication was addressed to the School Committee, and, after a conference with that committee, and fully explaining our views, not only with reference to the question of rooms but also as to the general style and character of the buildings, a reply was received in the shape of an order passed by the committee, of which the following is a copy:

“The Committee on School Houses report that they have lately been consulted by the Schoolhouse Commissioners with regard to certain questions that have arisen in connection with new school buildings about to be erected by that Board, more especially as to the necessity or expediency of extending the plans of grammar schoolhouses to include accommodations and conveniences beyond those usually provided, but suggested by architects and masters as essential to a modern schoolhouse.

“This is a matter deserving serious attention for several reasons. Not only is the initial cost of a building to be considered, but the cost of maintenance is of no less importance, especially in view of the fact that the annual expense of operating the school plant is steadily and largely increasing, and in much greater ratio than the valuation of the city upon which school expenditures are, under the present statute, based.

“Your committee have personally visited a number of schoolhouses, including those recently completed, as well as others of an earlier date, but comparatively modern, and have also obtained the opinion of the Superintendent upon the subject, and as a result of their investigation are of the opinion that a grammar schoolhouse should, in addition to the hall, class and dressing rooms, contain a master's room, a teachers' room, and a store-room for books; by the latter is meant a room in which text-books and books for supplementary reading may be stored. If the school possesses a library, it can be kept in bookcases placed either in the master's office, in the hall, or in the teachers' room, or in all. Rooms for woodworking and cookery should be provided wherever rooms for these purposes do not exist in the immediate neighborhood. Neither a sub-master's office, nor separate reception-rooms, nor recitation-rooms, nor a drawing-room, nor a sewing-room, nor a laboratory, appear to be essential. They are luxuries which can be dispensed with, and which ought to be dispensed with, under existing circumstances. It is also believed that a gymnasium and baths are not necessary except, perhaps, in certain of the more congested quarters of the city. In a primary building one teachers' room and a small storeroom for books are all that are essential in addition to the class-rooms and dressing-rooms.

“The adoption of a definite policy with regard to schoolhouse construction would tend to produce a certain general uniformity and correspondence between buildings of the same class erected

in various parts of the city, not necessarily in their architectural features, for here may well be allowed considerable latitude for the exhibition of taste and skill on the part of the various architects, but desirable from an economic standpoint. It is, of course, clear that there is a certain type of excellence in construction and material which the city ought reasonably to conform to in new buildings, far in advance of that followed twenty or even ten years ago, but it should not be forgotten that with a fixed and limited amount available for additional permanent accommodations, increase in cost of construction involves a corresponding decrease in the number of pupils to be accommodated, and consequently no one building should be allowed materially to exceed in cost the standard which may be established for guidance in making additions to the school plant during the next few years.

“Thus your committee believe, and the Board of Schoolhouse Commissioners agree, that the new schoolhouses about to be erected should be plain, substantial structures, built in the most substantial manner, devoid of unnecessary or extravagant ornamentation, but attractive and tasteful from an architectural standpoint, the exterior walls to be, in general, of plain red brick, with a reasonable amount of granite or sandstone trimming, and the interior fittings such as will meet the requirements of durability and fitness for the several purposes for which they are intended, without being unnecessarily expensive.

“In conclusion, your committee recommend that a copy of this report be transmitted to the Schoolhouse Commissioners as expressive of the views of this Board upon the subject herein discussed.”

The Commissioners have notified the architects that this met with their approval, and have asked them to govern their plans accordingly.

Following on these lines, and making use of the various good plans and specifications submitted by the architects now working for the Board, the attempt is being made to draw up a model specification which shall serve as an outline on which the architect may write his specification, and as a guide to show what quality of material and workmanship is considered suitable for school work, and to supplement this by drawings of those details which repeat themselves in all schools, and which need never vary except when some improvement is made. This would apply to the finish of doors and windows, the base, blackboard finish, bookcases, wardrobes, the arrangements in the sanitariums, etc. Still more desirable is it to have somewhat uniform systems of heating and ventilation, not only because they must in any case conform to a standard, but that the operation and repairs of the plants may be simplified. With this end in view the Board

appointed Messrs. French & Hubbard to advise with them and take charge of all heating and ventilation, either in the new or the old schools. The same firm lay out all new electric work, so that in the buildings now under contract the heating plants are somewhat similar, and are all of the same grade of efficiency. The superintendence of competent engineers should prevent the recurrence of such difficulties as developed in the South Boston High, the Roger Wolcott and the Bigelow schools. The Commissioners feel sure that the saving in restudies and delays effected by this systematizing of the work will enable the architect to relinquish half of his percentage on the domestic engineering without loss.

IX.

GENERAL DEDUCTIONS.

Aside from the general requirements in regard to simplicity in the character of the exterior of the buildings, which has been previously noted in the communication addressed to the Commissioners by the Committee on School Houses, the Commissioners find that cornices with heavy projection and roofs of steep pitch are alike undesirable. It is evident that with the necessity for windows extending to the ceiling line, a cornice with heavy projection will either cast a shadow on the windows of the top story, or if raised sufficiently above the windows to avoid this, will be enclosing more space above the ceiling than is necessary for non-conducting purposes; and that a pitched roof is undesirable unless the space in the roof can be utilized for an assembly hall, which in the case of primary buildings is not required.

The Commissioners therefore suggest that where a flat roof is adopted the cornices should be simple, with slight projection, and the parapets of so little elevation above the roof as to make it not extravagant to flash them completely with copper on the inside; and that where a pitched roof is used, which serves merely as a covering for the building, it should be of as low an angle as is compatible with a tight roof, and the eaves of such projection and height above the windows of the upper story as not to interfere with their light.

The following general conclusions have been drawn as a guide towards a standard:

Primary rooms should be about 24 by 32 feet, to accommodate 50 desks. This in some cases could be reduced, and for ungraded classes in the foreign districts, where older children are in lower grades, the size of desk would be increased and the number of them diminished.

The largest primary desks are 21 inches wide; they are spaced with an aisle from 15 to 17 inches, and $28\frac{1}{2}$ inches apart from back to back. Grammar rooms are 26 by 32 feet for 50 children. The desks are 24 inches wide, the aisles 17 inches, and the desks 34 inches apart from back to back. The Commissioners are now studying these sizes, which may be modified. The children's desks and chairs are the subject of a special report, prepared for the Commissioners from the best authorities by Dr. Frederic J. Cotton, which will be found in Appendix VIII. High schoolrooms are sometimes the same as grammar, but may vary, and with desks up to 26 inches wide. The total area of the building on a classroom floor should not be more than double the area within the walls of the class-rooms on that floor. The height of the rooms, when lighted from one side, should not be less than 13 feet, the windows should extend to the ceilings, and should contain a glass area equal to $\frac{1}{5}$ of the floor area—roughly from 160 to 175 square feet, measured inside the sash.

The coat-room should be adjacent to the school-room at the teacher's end, and have two doors opening into the school-room for circulation, but none into the corridor. The teacher has thus more perfect control of the class. The Primary School in the George Putnam District is an example of this.

Corridors should be wide, at least 10 feet for a 6-room floor plan, and with external light. Staircases should be fairly wide, but preferably not over 5 feet, and with risers not over $6\frac{1}{2}$ or 7 inches, and even less in primaries. Where toilet-rooms are in the basement it is desirable to arrange the stairs so that those coming in and going to the toilet-rooms will not meet on the stairs those going up to class-rooms. In most cases it is advisable to have basement entrances, with convenient thoroughfare through the toilets to the staircases. The staircases in daily use should be the fire-escapes, and should therefore be easy of access and fire-proof.

The toilet-rooms in general are in the basement, but the plans of the primary school in the Phillips District, and the primary in the George Putnam District, are examples of distributed toilets on the various floors. In the latter building the height of two class-rooms serves for three stories of toilets, etc. The special fixtures recommended are described elsewhere; in general, the simplest forms, the most easily cleaned and adapted for thorough ventilation, are the most sanitary. Ease of cleaning should be a prime consideration in the school generally; and a hospital base, a minimum of wood-finish in the rooms, and the simplest detail on the stairs, are desirable.

The bookcases should be of the simplest description, but with movable shelves, dust-proof, and locked. The teachers' desks should be of hard wood, with a plain flat top. Desks for primary teachers should have one set of drawers, those for grammar school teachers two sets of drawers, with slide, and rail on back.

The furniture for masters' and teachers' rooms should be a roll-top desk, a lounge, either rattan or covered with an easily cleaned material, a few simple chairs, a bookcase and a good Brussels carpet. An opportunity for a gas or electric stove in the teachers' room is generally advisable, where there is no cooking-school.

The following letters issued to architects embody these requirements, and also outline the duties and compensation of the architects and the relations between the architect and the engineer.

LETTER TO ARCHITECTS.

Gentlemen, — You are hereby invited to accept the appointment of architect for and your appointment is confirmed by the Mayor. In consideration of the fact that the Commissioners will lay down the requirements at the outset, will furnish information for the specification, will employ engineers to lay out heating, ventilation and electric work, and write the specification therefor, and that the working specifications will be printed by the city, the commission paid will be $2\frac{1}{2}$ per cent. on the cost of the domestic engineering and 5 per cent. on the cost of the remainder of the work.

The architects will be called on to furnish to the Commissioners, for filing here, one set of tracing-cloth drawings, at $\frac{1}{8}$ scale, floor plans, elevations and sections, and such details at a larger scale as may be necessary to explain the specifications; two sets of blue prints, on cloth-mounted paper, and one set of blue prints for the Building Department; also one set of tracing-cloth plans from which blue prints can be taken for the contractor. (These prints will be taken by the Commission.) Also one correct and complete set of specifications as copy for the printer.

The services of the architects will be the usual full service, including specifications, full-size details and superintendence of the building complete; but the engineers will further superintend the domestic engineering. On completion of the work the tracing-cloth set on file in this office is to be corrected to agree with all changes made during construction.

Payments will be $2\frac{1}{2}$ per cent. on signing of all contracts, except those for heating, ventilation and electric work, and thereafter $2\frac{1}{2}$ per cent. on the amount of certificates issued each month on all contracts.

In regard to employing Messrs. Hollis French and Allen Hubbard as consulting engineers, we beg to notify you that we shall

expect this firm to examine the plans prepared for schoolhouses, to make complete drawings of the heating, ventilation and electrical work, and complete specifications, which shall form a basis for contracts. Messrs. French & Hubbard will also superintend the execution of this work.

All payments in connection with this work will be on certificates issued by your office, but accompanied in each case by certificates of Messrs. French & Hubbard as vouchers.

We enclose herewith general information regarding your building. . . .

GENERAL INFORMATION.

PLANNING SCHOOL- ROOMS.

(1.) *Size* will be 24 by 32 Primary, and 26 by 32 Grammar, and not less than 13 feet in clear.

(2.) *Windows* will be on the long side for left-hand lighting; they will contain not less than $\frac{1}{5}$ of floor area, about 160 feet for a room 24 feet wide; neither double run of sash nor double glazing will be required except in cases of unusual exposure, but an approved dust-proof weather strip; the head close to the ceiling, the sill about 2 feet 6 inches from floor. Finish with plastered jamb, no architrave, metal corner bead.

(3.) *Doors*. — Two doors 3 by 7 feet, one at either end of the long wall or one 3 feet 6 inches by 7 feet. If hinged, they will open into corridors, or double swung; glass in door, no transoms. In any case they must have locks, no architrave, metal corner bead.

(4.) *Floors* will be Georgia pine rift, or maple.

(5.) *Walls* will be painted burlap up to chalk rail level (window stool), and above this plaster, tinted in water color; the blackboards, about 4 feet high (from 2 feet 6 inches to 6 feet 6 inches) will be behind the teachers and on one long side. These will be of the best black slate.

(6.) *Ceiling* will be plaster, no paint nor tint.

(7.) *Lights*. — Six groups of four lamps each and light for teacher's desk.

(8.) *Heating and Ventilation*. — The inlet for heat about 5 square feet, the outlet for ventilation about 5 square feet for gravity system and 3 square feet for fan.

(9.) *Bookcase*. — Provide a bookcase capable of containing 300 octavo volumes.

WARDROBES.

(1.) *Size*. — Wardrobes will adjoin school-rooms, and be about 5 feet 6 inches wide.

(2 and 3.) *Windows and Doors*. — Outside light, with two doors, both if possible opening into school-room and no door to corridor. Doors, double swung about 2 feet 6 inches wide.

(4.) *Floors* as in school-rooms.

(5.) *Walls*. — Burlap up to hook rail; pole on brackets with hooks under; pins over and 7 inches to 9 inches o. c. (Shoe and umbrella rack below.) Finish above with plaster tinted.

(6.) <i>Heights for Hooks and Pins.</i>	{	Kindergarten, 30 inches.
		Primary, lower, 36 and 44.
		“ upper, 40 “ 48.
		Grammar, Grade IV., 44 and 56.
		“ “ V., 46 “ 58.
		“ “ VI., 48 “ 60.
		“ “ VII., 50 “ 62.
		“ “ VIII., 52 “ 64.
		“ “ IX., 54 “ 66.

(7.) *Ceiling*. — Plaster.

(8.) *Light*. — Two lamps, ceiling outlet.

(9.) *Heating and Ventilation*. — Heating direct; ventilation, direct, $1\frac{2}{3}$ square feet area cross section.

CORRIDORS.

(1.) *Size*. — Not less than 8 feet wide for four rooms on a floor, not less than 10 feet for over four rooms, governed by length, access to stairs.

(2.) *Windows*. — Outside light desirable.

(3.) *Doors*. — Fireproof doors in second class buildings, as required.

(4.) *Floors*. — Tile or terrazzo floors in first class buildings, wood like rooms in second class.

(5 and 6.) *Walls and Ceilings*. — Painted burlap 7 feet high, untinted walls over, and ceilings.

(7.) *Light*. — Ceiling lights, two lamps each.

(8.) *Heat and Ventilation*. — Heat direct. Ventilation, none.

STAIRCASES.

(1.) *Number and Construction*. Determined by building laws.

(2.) *Material*. — The treads North River stone, or asphalt; or concrete construction with

granolithic surface. Rails of simple pattern easily cleaned.

SANITARIES.

(1.) *Size*.—General toilet-rooms in basement, in size approximating space for three water-closets for each class-room, two girls', one boys', and 36 inches of urinal for every class-room. Slate sinks, 12 inches in length for each school-room, and one fountain for every two school-rooms.

(2.) *Windows*.—Arranged for ample outside light, and for convenient supervision and circulation.

(3.) *Doors*.—The doors arranged "in" and "out," with spring or door-check, glazed.

(4.) *Floors*.—Asphalt, boys' drained to urinal, girls' to floor-wash.

(5.) *Walls*.—Salt-glazed or other non-porous inexpensive surface, 7 feet high, above brick painted.

(6.) *Ceiling*.—Untinted plaster.

(7.) *Light*.—Ceiling lights in groups of three lamps.

(8.) *Heat and Vent*.—Heat direct. Ventilation through fixtures, back of urinals, and 13 square inches local vent in water-closet.

PLUMBING FIXTURES.

(1.) *Water-Closets*.—(a.) The basement water-closets for primary and certain grammar schools are approved wash-out vitreous earthenware or enamel iron latrines, or short-hopper closets; elsewhere a heavy wash-down closet, all as specified by the Commissioners, 13 square inches local vent from each section of closet, automatic flush.

(b.) Slate partitions for latrines resting on top of range, 5 feet 6 inches high and about 4 feet wide; for closets 8 inches above floor, 5 feet 6 inches by 6 feet high, and 4 feet wide, in both cases supported at ends with iron pipe from floor to ceiling. No doors. (These may be added later.)

(2.) *Urinals*.—The urinals will be of slate, floor-slab and trough, and back 4 feet 6 inches high, without partitions, flushed automatically with $\frac{1}{2}$ -inch perforated pipe, vented at bottom (opening 10 square inches for each 16 inches length) into space behind back. For all these the Commissioners will supply blue prints.

(3.) *Piping*.—(a.) Cast iron must be in trenches in basement, running trap with direct

indirect fresh air inlets, clean-outs at every change of direction; soils and vents exposed as far as possible, no asphaltum, but oil-tested red lead and three coats paint.

(b.) Supplies exposed as far as possible; where covered may be lead, elsewhere brass, no n. p. Hot water for janitor's use in basement, and, if convenient, for master's and teachers' toilets. Supply from boiler, and from summer boiler, if any, or from a gas-heater.

SPECIAL ROOMS.

(1.) **MANUAL TRAINING-ROOM.**—(a.) Area of room should be from 900 to 1,100 square feet, for twenty-eight to thirty benches.

(b.) *Good Light.*—Where grade varies the room should be located at the lowest corner, and the windows should be as near full length as possible. Light should come on two adjacent sides.

(c.) *Artificial Light.*—Artificial light should be provided in six groups of four lamps, near ceiling.

(d.) *Heat and Ventilation.*—Heat and ventilation should receive the same consideration as in other rooms. A little direct radiation is generally found necessary.

(e.) *Stock-room.*—Stock-room should contain at least 80 square feet. It is preferable that it should be long and narrow, as it is wall space that is desired. Two 18-inch shelves should run around the room, 5 feet 6 inches and 6 feet from the floor.

(f.) *Wardrobe.*—Small wardrobe is sufficient, only wall space for thirty hooks being needed.

(g.) *Teachers' Closet.*—Where possible, the teachers' closet should be large enough to be used also for storage of finished work, and should be fitted with all shelving possible, as well as with the customary coat-hooks. An area of 40 square feet is adequate.

(h.) *Wall Cabinet.*—A wall cabinet, similar to the bookcases in the other rooms, should be built in wall.

(i.) *Blackboards.*—Blackboard space of about thirty running feet is needed.

(j.) *Wall Space.*—Blank wall space of about twenty-eight feet is needed for work-racks, 6 feet 6 inches high, and 2 feet deep. (These work-racks themselves might well be included in the contract.)

SPECIAL
ROOMS.
(Continued.)

(k.) *Wash-bowl*.—A wash-bowl or sink would be a convenience, but not a necessity.

(l.) *Arrangements*.—The stock-room, storage-room, teachers' closet, and even the work-racks, may be placed at a distance from the class-room if necessary, but the arrangement shown in the accompanying blue-print is much preferable, and should be followed wherever possible. The passage to the room should be carefully screened from the sanitariums.

(m.) *Finish of Room*.—The room should be finished as an ordinary school-room.

(n.) *Furniture*.—The furniture comprises twenty-six to thirty benches, same number of stools, four display frames, about 6 feet long and 30 inches wide, demonstration steps and guard-rail as shown in plan, teachers' desk, table 4 feet by $2\frac{1}{2}$ feet, with unfinished top, one desk chair and two common chairs. The work-racks which have been mentioned above may be considered either as fittings or furniture, and the number of compartments depends upon the number of boys by whom the room is likely to be used. Some additional shelving may occasionally be required in the class-room.

(2.) *COOKING ROOM*.—(a.) Should have an area of from 1,000 to 1,200 square feet; the lesser area may be used if a recess is provided for ranges, boiler and wood-box.

(b.) *Windows*.—As much light as a class-room, but not necessarily left hand; if located in a corner, light from two sides.

(c.) *Heating and Ventilation*.—Less heat is required than in a class-room, but the ventilation should be the same, with additional vent from the demonstration ranges.

(d.) *Interior Finish*.—Similar to school-rooms, blackboards 4 by 10 feet back of teacher's desk. Walls and ceilings painted in oils. A basement room may have painted brick walls.

(e.) *Wardrobes*.—Provision for 24 pupils; clothes hooks in separate lighted closets and small teacher's closet.

(f.) *Fittings*.—Work benches. Accommodation for 24 pupils, allowing not less than 4 square feet to each, and fitted with compartment for utensils, bread-board in recess and gas stove set on a brass plate; arranged in the form of an ellipse, with access to centre from two sides; top of pine 26 inches wide, open under-

SPECIAL
ROOMS.
(Continued.)

neath and supported on pipe standards. One section detached and fitted as demonstration bench; benches to have a clear space of 4 feet all around. Dining table (furnished under another contract) is to be set in centre of ellipse, or other space if available.

(g.) *Dresser*. — 10 feet long in 3 sections, 4 adjustable shelves and glazed sliding doors at top; one nest of 3 drawers and 2 cupboards on lower part.

(h.) *Fuel Box*. — In two compartments, each about 24 inches square and 30 inches deep, with hinged lids; small shelf in one section.

(i.) *Bookcase*. — Similar to those provided in class-rooms.

(j.) *Cold Air Box*. — Attached to sill; holes bored for air circulation; hinged lids.

(k.) *Sink*. — Of soapstone. 60 inches by 22 inches by $7\frac{1}{2}$ inches, with 24-inch back; two cold and two hot water cocks; waste connections to grease trap (see instructions for plumbing); drip shelves 24 inches long at each end of sink. Sink should be near ranges.

(l.) *Hot Water Boiler*. — (See instructions on plumbing).

(m.) *Coal and Gas Ranges*. — Allow the sum of \$150 for the purchase of; contractor to make all connections.

(n.) *Tile*. — The floor space occupied by the ranges and the wall space back of them (include sides if in recess), to a height of 6 feet, place 6-inch unglazed red tile.

(3.) **KINDERGARTEN**. — Placed on first floor in a regular class-room, preferably a corner room with a south or southeast exposure, and an adjoining room with an area of about 200 square feet, connected by a door at either end of dividing partition; if a corner class-room is used, light from two sides; the smaller room should be well lighted. The other general arrangement and fittings of rooms should be similar to the regulation class-room, except that a tack-board covered with burlap at top of black-board should be provided. Two ordinary bookcases, or one large one, should be provided in class-room. A store closet with 12-inch shelves should be provided for kindergarten supplies, and a clothes closet sufficiently large for the apparel of three teachers should be provided; the wardrobe should be of the regulation pattern,

except that clothes hooks should be arranged not higher than 2 feet 8 inches from floor. It would be convenient but not essential to provide a water-closet of a low-down pattern and a slate sink adjoining kindergarten.

On the floor of main kindergarten regulation circles and lines for kindergarten games should be painted in parti-colors. (See standard plan).

HEATING AND
VENTILATION.
GRAVITY SYS-
TEM.

(1.) *Heat Ducts for School-rooms.*—(a.) Size. Allow about 1 square foot area cross section for each ten occupants.

(b.) Location in corner room to be within 10 feet of outside wall.

(c.) Location in room with one outside wall to be on inside wall near middle.

(d.) Opening to be about 8 feet above floor.

(e.) Opening to be about 25 per cent. larger than area of duct.

(f.) No guard will be put in.

(g.) The opening will be finished inside like adjoining wall.

(2.) *Vent Ducts for School-rooms.*—(a.) Size. Allow about 1 square foot area cross section for each ten occupants.

(b.) Location in corner room at inside corner of room, and where possible on same wall as heat-duct.

(c.) Location in room with one outside wall to be on inside wall near middle.

(d.) The opening will be full size of vent-duct.

(e.) The floor will be carried into the bottom of duct and base-board carried in around. The inside of duct to be finished to match adjoining wall.

(f.) No guard will be put in.

FAN SYSTEM.

(1.) *Heat Ducts for School-rooms.*—(a.) Size. Allow about 1 square foot area cross section for each sixteen occupants.

(b.) Location in corner room to be within 10 feet of outside wall.

(c.) Location in room with one outside wall to be on inside wall near middle.

(d.) Opening to be about 8 feet above floor.

(e.) Opening to be twice the area of duct.

(f.) No guard will be put in.

(g.) The opening will be finished inside like adjoining wall.

EXHAUST FAN
SYSTEM.

(1.) *Vent Ducts for School-rooms.*—(a.) Size. Allow about 1 square foot cross section for each sixteen occupants.

(b.) Location in corner room at inside of room, and where possible on same walls as heat-duct.

(c.) Location in rooms with one outside wall on inside wall near middle.

(d.) The opening will be full size of vent-duct.

(e.) The floor will be carried into the bottom of duct and base-board carried in around. The inside of duct will be finished to match adjoining wall.

(f.) No guard will be put in.

TOILET-ROOMS
VENT.

(a.) Each doorway into toilet-rooms is to have an opening, either through lower panels with register face or underneath the door, equal in net area to the size of vent-duct from room.

(b.) Size of vent-duct from toilets to be equal to 12 square inches for each closet, and each 16 inches of urinal space.

WARDROBE
VENTS.

(a.) Each room to have a vent duct $12\frac{3}{4}$ square feet area cross section, with top and bottom registers.

(b.) The doorway into rooms at end furthest from vent-duct is to have free opening from school-room provided as for toilet rooms, so that air can pass from school-room through wardrobe and out vent-duct.

ELECTRIC
WORK.

(a.) *Service.*—This should enter basement underground. The main switch cut-outs and meter should be as near entrance of service as possible. If all conduits are to be concealed, space should be provided above ceiling for a $2\frac{1}{2}$ inch pipe from service switch-board to each end of a large building, or one pipe to the centre of a small building. Near each end of a large building, or near the centre of a small building, either an open shaft at least 24 inches by 30 inches or a slot in the wall 4 inches deep and 24 inches wide, should be provided from a point just above basement ceiling to a point above ceiling of top floor. Architraves and doors for cut-out cabinets should be furnished by general contractor.

X.

FINANCIAL STATEMENT.

The Commissioners have carefully considered the desirability of publishing a detailed financial statement, and have concluded that they were not justified in embodying in this special report information which is accessible by reference to the Auditor's Report. They have, however, appended a brief statement showing how the three appropriations of \$1,000,000, \$1,000,000, and \$500,000 have been expended. (See Appendix III.) A short statement of the expenditures for repairs corresponding with that in the Auditor's accounts is given in Appendix IV., and a detail statement of expenditures for repairs by schools. A brief statement showing how the balance handed over to the Board by the Committee on New Buildings and the \$90,000 appropriated in 1902 have been expended is given in Appendix V. Any further details in regard to the expenditures in any of these departments will be gladly furnished by the Commissioners.

XI.

CONCLUSION.

Thus is briefly reviewed the work that has been done: first, to meet those needs which actually existed in January, 1902; second, to put the schools in more sanitary condition; third, to repair the older buildings; and fourth, to complete the schools handed over by the School Committee. In many respects the Commissioners feel that they have fallen short of their duty, but especially they feel that they have neglected the equipment of the older schools with means of escape in case of fire, owing to the utter impossibility of attending to all the matters that seemed imperative. They have also perforce neglected items of enlargement or addition, or new buildings, which, being outside the list, can be cared for only by the amount appropriated for current growth, which was not this year available.

They have also been faced by various problems in regard to which a fair decision has been extremely difficult. Under present conditions it is necessary to advertise for city work, and it must be acknowledged that many of the city's best mechanics will not estimate under those circumstances. To those who are willing to come forward and bid for the city's work the Commissioners feel under some obligation, as for a

favor received, for these men give their time to figure in sharp competition, and do work for the city at prices certainly lower than those current for similar work. When selecting men to bid on repair work under \$2,000, the Commissioners feel not only justified but bound in common fairness to invite the men who are willing to bid for the advertised work.

The report would not be complete without some reference to the labor unions, who are constantly asking for more definite recognition. In the spring the Commissioners gave the representatives of the Building Trades Council a hearing on their request to have the city work restricted to union labor. It was explained that this was illegal, even if desirable, and that the present contract, which insisted on the current rate of wages and number of working hours, insured fair treatment for all men who worked for the city.

The advertisement for bids further states that the Commissioners reserve the right to give preference to a bidder who agrees to pay union wages. This seems to be all that can fairly be asked, and the Commissioners are fully determined to see that these terms are complied with by the contractors, and have done their best to follow up the various charges that have been made by the labor unions as to violations of these terms. In most cases the charges have not been definite and have not been substantiated, but in one case a deliberate violation of the terms of the contract was thus exposed.

When, however, an organization attempts to criticise workmanship on a building which is being executed by the Commissioners under competent architects, it is distinctly outside of its province. Every unwise or intemperate action on the part of representatives of labor is a drag on the progress of the labor organization and its best interests. When membership in a union is a guaranty of ability, when a union card means honest, faithful and efficient workmanship, every employer will want union men; but if that point is ever to be reached, only the very best representatives of labor should be the leaders. The Commissioners are ready at any time to hear any complaints or requests presented in due form by the labor organizations, but unless complaints are well founded on fact, and unless requests are reasonable, such hearings do more harm than good.

In attempting to utilize to the best advantage the force of the Schoolhouse Agent, the Commissioners moved with caution, endeavoring to avoid mistake. In laying out new sanitation for the old buildings, architects were appointed at

first as in the new work, but after six months' experience it was found that the Board could handle this work to better advantage in their own office. They increased the draughting force, and now all plans and specifications for this work are executed on a uniform basis. Finding constant need of the services of an engineer, they have established an engineering branch in the draughting-room, and now make all surveys for new or old work and grading or planting plans for the old buildings.

The force of inspectors was continued as under the Schoolhouse Agent, but finding it inadequate to cope with the greatly increased amount of repair work and to superintend the new sanitation, they increased the force with a superintendent of construction, and provided more horses and wagons for the summer of 1902. As soon as the rush of this work was over the horses and wagons were sold and the districts of the inspectors rearranged so as to make them more compact and dispense with the necessity of supporting a stable. It remains to be seen whether the summer work can be carried on under these conditions. At present the system seems to work well, and the masters report a more prompt attention to their requisitions for repairs.

During the summer, when the School Committee do not meet, the Commissioners missed greatly the advice and assistance of the Committee on Schoolhouses. In the autumn the Board asked for some arrangement whereby frequent consultation might be possible, and at the suggestion of the President of the School Committee the Board agreed to attend the meetings of the Committee on Schoolhouses. Since October, 1902, one or more of the Commissioners have been present at the meetings of the Committee on Schoolhouses, whenever matters affecting the Board were to be discussed.

The Board further felt that without intimate association with the masters it would be impossible to handle to the best advantage the many problems coming before them. They have therefore tried to visit the masters at the schools, and to receive them personally at their office; but as the mass of work interfered somewhat with this they have called one, and expect to call more, conferences of masters at their office. The advice and assistance of the masters cannot but prove of great value to the Board in its work.

Some special experiments were made with a view to determining the best form of artificial light, with the result that the Board has decided on the use of light reflected from a white ceiling. The engineers have designed a special fixture to give the desired result.

From the Corporation Counsel the Commissioners have received much valuable help and advice. The old form of contract included in all cases a date and a forfeit, even where a number of contracts and divided responsibility made its enforcement impossible. In place of this we have first a contract with a date, and a forfeit and bonus clause, when a single responsibility for completion makes the clause operative; and another form without either a forfeit or bonus, but the power left with the officer to exact damages for unnecessary delays. All the summer sanitation work was on the first basis, and the time clause was strictly enforced. One of the new buildings is let on a single contract and has a forfeit and bonus of twenty dollar a day. One other, in which the general contractor named a date for completion as a part of his bid, has a similar time clause; but the other contracts were advertised without a date, which became a subject of agreement between the contractor, the architect, and the Board, before the contract was awarded. In these cases the Board has the usual power to take the work out of the hands of the contractor if his work is not prosecuted with due diligence. All these matters have necessarily taken much time that another year can be devoted to the actual business in hand.

The Commissioners cannot close this report without a grateful acknowledgment to his Honor, the Mayor, for his steady and powerful support of everything which has made for the efficiency and authority of this department; and for the benefit of his sound and wise advice which has in many cases saved the Board from making mistakes and helped to establish standards and precedents which shall serve as a guide for the future work of the Board of Schoolhouse Commissioners.

Respectfully submitted,

R. CLIPSTON STURGIS,

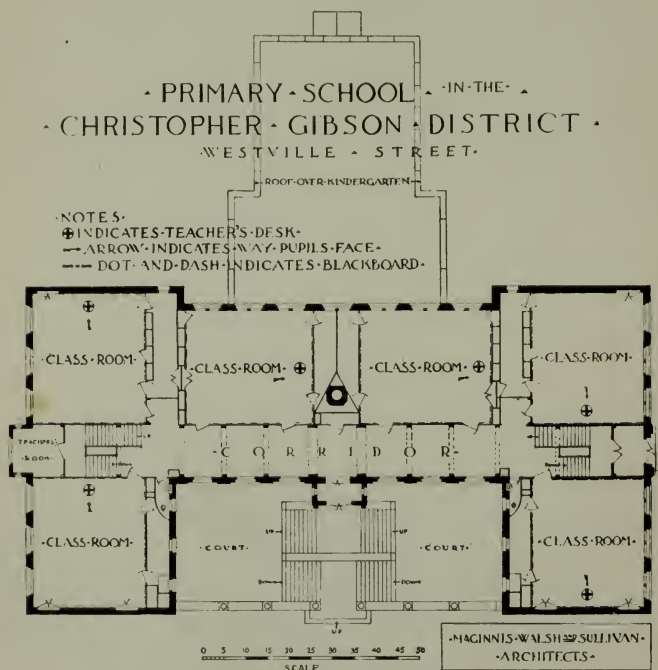
JOHN H. COLBY,

FREDERIC O. NORTH,

Commissioners.

APPENDICES.





• FIRST FLOOR PLAN •

APPENDIX I.

NOTES ON NEW BUILDINGS.

PRIMARY SCHOOLHOUSE, CHRISTOPHER GIBSON DISTRICT, WESTVILLE STREET.

This building is located on Westville street, with Bowdoin square and Head street on two sides and the lot line in the rear. The building, therefore, has streets on three sides, its own ample yard on the fourth, and is assured of permanent light. The building covers an area of 13,250 square feet, and stands on a lot containing 30,370 square feet, which drops sharply to the east, leaving the basement above grade at the south and the east. The kindergarten, a one-story building, occupies part of the space at the rear, the remainder is divided into two brick-paved playgrounds, and the areas on the front are laid down in grass.

The basement contains the boiler and coal rooms, the toilets for the boys and girls, two large play-rooms and two small play-rooms, which are so arranged that the portion toward the east, where they are above grade, can eventually be used for two additional class-rooms. In the L at the rear there is one large kindergarten room, 35 feet square, and two smaller rooms, 18 by 20 feet. On the first and second floors there are six rooms each, with wardrobes and emergency closets. There are, therefore, twelve class-rooms, three kindergartens, and two more unfinished rooms, seventeen in all when complete.

The building is constructed of brick exterior walls, with steel columns for bearing partitions inside, and divided with partitions of expanded metal and plaster. The floors are fireproof, steel beams, with concrete arches. The roof is a pitched timber frame, covered with slate, and separated from the top story by the concrete arches of the ceiling. The building is therefore of practically fireproof construction.

The area of the building on the first floor above the kindergarten is 8,527 square feet; the school-rooms on this floor have an area of 4,680 square feet. Its cubical contents are 516,624.18 cubic feet. The building has been let in a single contract, including all trades, for the sum of \$122,178, making the cost per cubic foot \$0.23. The cost per class-room, counting the three kindergartens as two rooms, is under \$9,000 apiece, but there are two more rooms available at a slight additional cost.

Heating and Ventilating. — System: The system adopted for this building for steam is gravity. For air it is gravity, together with a small fan for the kindergarten department, which is located at a grade lower than other class-rooms, making it impracticable to carry out the gravity system for air and set the radiation low enough to return water to the boilers by gravity. By

the use of the fan we are able to get radiation up sufficiently high above the water line of boilers to get the return water back without the aid of a pump. There is a 42-inch fan, run by a three-horse-power electric motor, designed for this school.

Boilers: There are two horizontal steel tubular boilers with a total of about 140 horse-power. There is also one boiler for furnishing steam to aspirating coils when the large boilers are not in use, commonly called the Summer Boiler. This boiler is a 9-section No. 2 Mercer cast-iron sectional.

Radiation: There is a total of 6,553 feet of radiation, made up of direct radiators of plain pattern and indirect gold-pin radiators.

Temperature Control: Automatic temperature control is provided for the kindergarten department only. The temperature is to be controlled in the other class-rooms by means of hand mixing-dampers, controlled by the teachers in these rooms.

Electric Work. — This building is wired throughout for electric light, and here as in all other buildings the fixtures are included in the contract, those in the class-rooms being arranged to give reflected light from the ceiling, which the Commissioners have found to give the most equable light and the least trying to the eyes. There is a system of electric clocks and bells. The figures are: 260 outlets, 503 lamps, 16 clocks, and 23 bells.

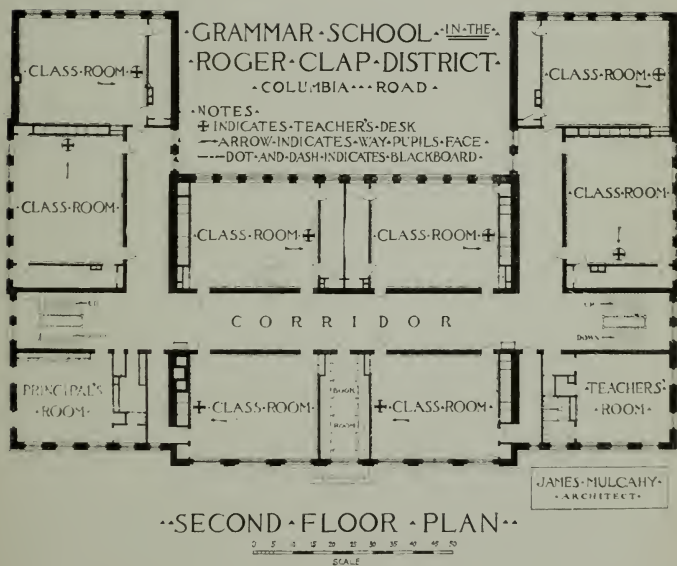
GRAMMAR SCHOOL IN THE ROGER CLAP DISTRICT, COLUMBIA ROAD.

This schoolhouse is located on Columbia road, near Edward Everett square. The building covers an area of 15,042 square feet, and is situated on a lot containing 50,075 square feet. It has the light on Columbia road on the front, has ample light on the east and north, and on the west is 16 feet from the lot line at the nearest point, a distance constantly increasing, so that permanent light is practically assured on all sides. The playgrounds are at the rear, to the north of the building, and the whole of the area on the other three sides is graded and sodded, but no planting is at present included.

The basement contains a boiler-room, coal-areas, toilet-rooms for the boys and girls, two large play-rooms, manual-training room and cooking-room. The fittings of both these latter are included in the contract price.

There are ten class-rooms with wardrobes on the first floor, and on the second floor eight class-rooms with wardrobes, a master's and a teachers' room, janitor's closet, and emergency toilets. On the third floor, occupying the greater portion of the space, is the assembly hall.

The construction is fireproof throughout, the outside walls of brick and the dividing partitions metal and plaster, covering steel columns. The floors are of steel beams and concrete arches, and





the roof steel frame, boarded and slated. The exterior of the building is of common red brick and limestone with a slated roof. The area of one floor is 15,256 square feet, and the area of the class-rooms on that floor 8,060 square feet. The cubical contents of the building are 894,941 cubic feet. The building was let in four contracts, aggregating \$183,878, making the cost per cubic foot about \$0.20. The main toilets are vented through the fixtures, an opening of 13 square inches from every closet, and an equal amount from every 16 running inches of the urinal.

Heating and Ventilating.—System: The system for steam is gravity. The system for air is gravity.

Boilers: There are two 100-horse-power Worthington water tube boilers. There is also one eleven-section No. 2 cast-iron sectional Mercer boiler, for summer boiler.

Radiation: There is a total radiation of 11,639½ feet made up of direct radiators and indirect gold-pin radiators.

Temperature Control: Automatic temperature control is to be installed for the manual-training and cooking school-rooms. The temperature of other class-rooms is to be controlled by means of mixing dampers controlled by the teachers in the various rooms.

Electric Work.—This building is furnished throughout with electric light, electric programme clocks, bells, and a complete system of telephones. This latter the Commissioners have not thought it desirable to install, except on schools above the primary grade. There are 464 outlets, 931 lights, 23 clocks, 27 bells, and 23 telephones.

PRIMARY SCHOOLHOUSE ON NORMAN STREET, PHILLIPS DISTRICT.

This school is located on the corner of Norman and South Margin streets. It covers an area of 17,890 square feet and stands on a lot containing 24,889 square feet, with light on three sides and a large area at the rear, above the ground floor.

It should be noted that the Commissioners were met here by a special problem, namely, the need of very large accommodation for children and the very large cost of the land; they have therefore based this building somewhat on the lines of the New York schools, providing unusual accommodation for play-rooms within the building itself, and supplementing this and the small yards by occupying the whole of the roof as a playground and so protecting it as to make it entirely safe.

The building contains, in the basement, coal-bins and toilet-room, and on the ground floor, a few steps down from the level of the street, a large play-room adapted for use as a hall, thoroughly lighted and thoroughly ventilated; a small gymnasium, toilet-rooms for the boys and girls, storeroom and janitor's office.

Upon the first, second, and third floors, which are alike, there are eight class-rooms with their wardrobes, and emergency toilets,

a room for the master, and two teachers' rooms, with their private toilets.

On the fourth floor there are six class-rooms, manual-training room, cooking school, and toilets sufficient in number to serve as emergency toilets for this floor, as well as for the use of the children in recess, who are dismissed to the roof.

The whole of the roof is occupied as a playground for the children, and is completely protected and enclosed by parapet walls and wire.

The building is of steel construction, first-class throughout. The exterior is of common red brick and limestone, with a small amount of terra-cotta.

The total area of one floor, above the basement, is 13,732.56 square feet, and the total area of class-rooms on one floor is 6,492 square feet. The total cubical contents of the building is 1,300,792 cubic feet. The cost of the land was \$59,839, and the awarded contracts for the building, which will cover all trades, except furniture, aggregate \$319,720, making a cost per cubic foot of about \$0.24, reckoned from the bottom of the cellar or ground-floor concrete to the highest part of the roof.

Heating and Ventilating.—System: The system adopted for this building for steam is a combination gravity and pump; that is, during the hours when school is in session the water will be returned to the boilers by means of the pump. At night, when the fires are banked, the steam pressure will be dropped, and by means of by-pass valves the water can be returned directly to the boilers. For air, there is a 12-foot plenum fan, run by a steam engine at twenty-five pounds pressure. When this pressure is required for running the engine, steam for heating the building will be taken through reducing pressure-valve to the heating system, so that about five pounds will be the maximum pressure on the heating system.

The ventilation is stimulated by means of aspirating coils, heated by exhaust steam from the steam-engine.

Boilers: There are two 144-horse-power Worthington water-tube boilers provided for this building.

Radiation: There is a total of 9,548 feet of radiation divided up into pipe coils for primary heater, direct cast-iron radiators and indirect cast-iron supplementary heaters.

Temperature Control: Automatic temperature control is provided in the shape of thermostats to control valves on the primary coil to maintain an even temperature of air from the primary coil, and thermostats in the various rooms to control valves on the supplementary heaters for the various class-rooms. There are to be no hand mixing-dampers in this building.

Electric Work.—This building is equipped with electric light throughout, with electric programme clocks, with bells, telephone system, and an elevator. The building is exceptional, being mixed grammar and primary, containing a large number of rooms and has more stories than is usual in Boston. It was there-

fore thought desirable to install a telephone system and also to put in a small elevator. The cost of this latter was \$3,500. There are 573 outlets, 1,246 lamps, 36 clocks, 43 bells, 36 telephones, and 1 elevator.

PRIMARY SCHOOLHOUSE IN THE MARTIN DISTRICT.

This building is located on level ground on the corner of Huntington avenue and Kenwood road. The total area occupied by the building is 12,025 square feet, and the lot has an area of 27,923 square feet. The building follows the lot line, and receives all its light from the playground, which is enclosed by the two wings of the building. Permanent light for all the rooms is thus assured. The playground is divided from Huntington avenue by a high brick wall, and fifteen feet of the space on Kenwood road is reserved as a planted area. The remainder of the open space is paved in brick.

The basement contains a boiler-room and coal-storage, small play-rooms for the boys and girls and their toilets, the manual-training room and cooking school.

The first and second floors contain six class-rooms each with their wardrobes and toilet-rooms.

The construction of the building is of brick exterior walls, steel columns, and metal and plaster partitions. The roof is of timber frame, boarded and covered with flat asphalt roof. The exterior is of common red brick and sandstone. The yards are enclosed by brick and iron fences and gates. The area on one floor is 12,190 square feet, and the area of the class-rooms on one floor 4,507.52 square feet. The building contains 652,630 cubic feet. The contracts aggregate \$148,761; making the cost per cubic foot \$0.23.

Heating and Ventilation.—System: For steam, gravity. For air, a plenum fan is to be installed, run by an electric motor of 10-horse-power.

The ventilation is stimulated by means of aspirating coils.

Boilers: There are to be two 15-section No. 5½ Mills cast-iron sectional boilers. There is also to be one 9-section No. 2 Mercer cast-iron sectional boiler for summer use.

Radiation: There is a total of 5,144 feet of radiation for this building, divided into primary coils, indirect gold-pin radiators, supplementary heaters and direct radiators.

Temperature Control: Automatic temperature control is provided for this building. There are thermostats to control the temperature of the air coming from primary coil, and also thermostats in the various rooms to control the valves on supplementary heaters.

Electric Work.—The building is wired for electric light, and fitted with electric programme clocks, and with bells. There are 334 outlets, 612 lights, 18 clocks, and 24 bells.

PRIMARY SCHOOLHOUSE, EMERSON DISTRICT.

This building is situated on the corner of Horace and Byron streets in East Boston. The building covers an area of 10,234 square feet, and stands on a lot containing 17,500 square feet. There is therefore not very much land to spare for the purposes of the yards, and as it was necessary to have both the cooking-room and the manual-training room as well as the play-rooms, in the basement, it was thought desirable to put the heating apparatus in a sub-basement. The building comes up to the street line on Byron street, and has a slight set-back from Horace street, where the chief entrances are, which is laid out in grass and hedged, and has two playgrounds at the rear.

The sub-basement contains the heating apparatus and storage for coal. The basement contains the play-rooms for boys and girls, one large room divided in the centre with an iron railing; the boys' and girls' toilet-rooms, the manual-training room and cooking-room, with their wardrobes. It should be stated that both of these rooms are well lighted, and that they will consequently be available for future school-rooms when the manual-training and cooking schools, not usually a part of primary buildings, are removed to their proper quarters.

On the first floor there are five class-rooms, a large kindergarten and a small kindergarten, and a teachers' room, with wardrobes and emergency toilets, a toilet for the kindergarten and for the teachers.

On the second floor there are six class-rooms, wardrobes, and emergency toilets.

The construction of the building is fireproof throughout. The exterior bearing walls are of brick, the interior bearing partitions partly of brick and partly columns and girders, the partitions of terra-cotta, the floors of steel frame with concrete and expanded metal arches, and the roof of the same, covered with an asphalt composition. The exterior is practically brick throughout, brick pilasters, with a brick entablature and parapet.

The area of one floor is 9,821.37 square feet, and the area of the class-rooms on one floor 4,489.46 square feet. The contracts aggregate the sum of \$122,916, making a cost per cubic foot of \$0.24, the cubical contents being 510,386.54 cubic feet.

Heating and Ventilating.—System: For steam, gravity; for air, gravity.

Boilers: There are two horizontal steel tubular boilers, 45 horse-power each, for this building. There is also one ten-section No. 2 Mercer cast-iron sectional boiler for summer use.

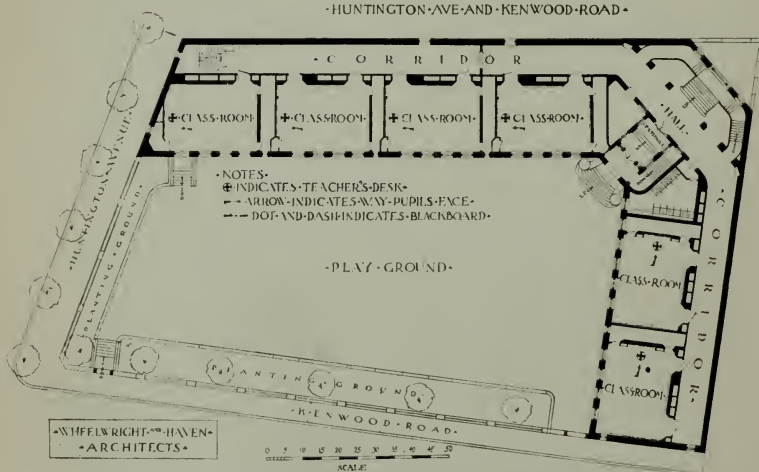
Radiation: There is a total of 6,900 feet of radiation, divided into gold-pin indirect radiators, direct radiators and coils. Aspirating coils are to be placed in vent-flues.

Temperature Control: The temperature is to be controlled in the various rooms by means of hand mixing-dampers controlled by the teachers. No automatic control of school-room temperature is provided.

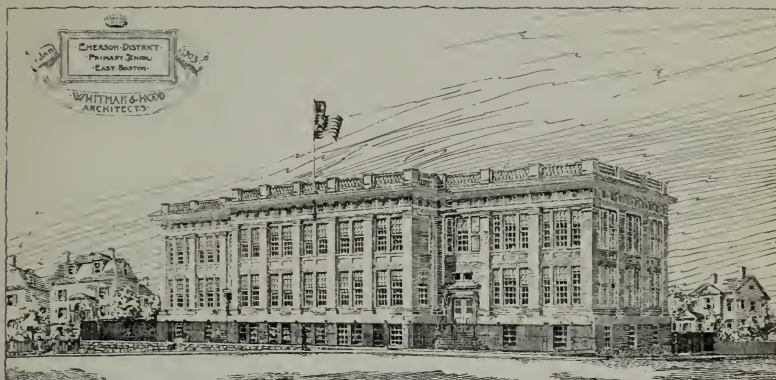
CITY OF BOSTON.
 PRIMARY SCHOOL - MARTIN DISTRICT.
 HUNTINGTON AVE. BY KENWOOD ROAD.
 WHEELWRIGHT & HAVEN ARCHTTS.



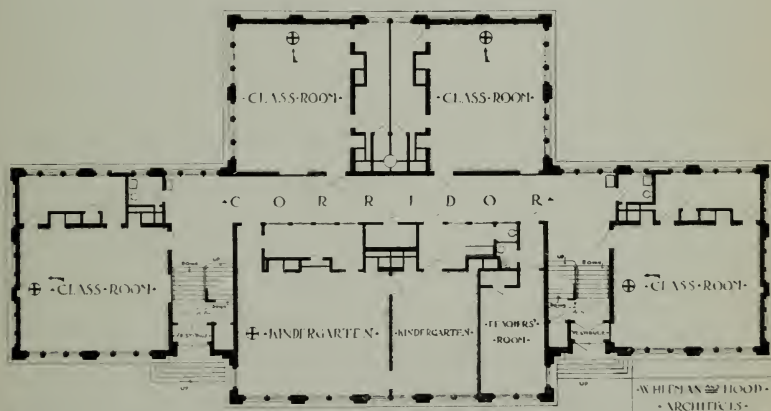
• PRIMARY • SCHOOL • -IN-THE-
 • MARTIN-DISTRICT-
 • HUNTINGTON-AVE-AND-KENWOOD-ROAD-.



• FIRST • FLOOR • PLAN • -AND- • LOT •



• PRIMARY SCHOOL • IN THE •
EMERSON • DISTRICT •
• HORACE AND BYRON STREET •



• NOTES •

- ⊕ INDICATES TEACHER'S DESK
- ARROW INDICATES WAY PUPILS FACE
- · — · — · INDICATES BLACKBOARD

0 5 10 15 20 25 30 35 40 45 50
SCALE

• FIRST FLOOR PLAN •

Electric Work. — The building is wired for electric light, and fitted with electric programme clocks and with bells. There are 246 outlets, 477 lamps, 15 clocks and 21 bells.

GRAMMAR SCHOOLHOUSE IN LOWELL DISTRICT, HEATH STREET.

This schoolhouse is located on Heath street, with two survey streets proposed, one on either side of line. The building covers an area of 12,345 square feet, and is on a lot containing 38,215 square feet. It is located within ten feet of the rear of the lot line, but with this exception has ample permanent light on all sides. The light at the rear affects nothing except the corridor. The playgrounds are on either side and at the rear, and will be entered eventually from the side streets. The area on the front of the building, the whole length of the Heath-street frontage, is graded and sodded, and is eventually to have ornamental planting.

The basement contains boiler-room and coal-storage, a play-room for the boys and girls, undivided, and so arranged that it can be partitioned, boys' and girls' toilets, manual-training room and cooking-room. On the first floor there are six regular class-rooms, one ungraded room, master's room and teachers' room and toilets. On the second floor there are eight class-rooms, coat-rooms and emergency toilets. On the third floor there are four class-rooms and an assembly hall covering the area of four class-rooms and the corridor between the same. The building has a total of nineteen class-rooms, cooking-room and manual training room.

The construction is fireproof throughout, the outside of brick, the main partition bearing walls of brick and the smaller partitions of terra-cotta. The floors are of steel frame, with terra-cotta arches and the roof of steel frame, book-tile and asphalt roof. The exterior of the building is of common red brick, with limestone ashlar in the basement and limestone trimmings. The groups of windows are framed with steel and covered with ornamental cast iron.

The area of one floor is 12,132.48 square feet, and the area of the class-rooms on that floor is 5,665.29 square feet. The cubical contents of the building are 856,777.38 cubic feet. The contracts aggregate \$214,065, making a cost per cubic foot of \$0.24.

Heating and Ventilating. — System: For steam, gravity; for air, gravity.

Boilers: There are two 100-horse-power Worthington water-tube boilers provided for this building. There is also one eleven-section No. 2 Mercer cast-iron sectional boiler for summer use.

Radiation: There is a total of 11,595 feet of radiation. This is divided into indirect gold-pin radiators, direct radiators and coils. Aspirating coils are placed in vent-flues.

Temperature Control: Automatic temperature control is to be installed for cooking school and manual training rooms. The

temperature of all other rooms is to be controlled by means of hand mixing-dampers controlled by the teachers.

Electric Work.—This building is furnished throughout with electric light, electric programme clocks, bells and a complete system of telephones. There are 367 outlets, 774 lamps, 24 clocks, 30 bells and 24 telephones.

PRIMARY SCHOOLHOUSE IN GEORGE PUTNAM DISTRICT.

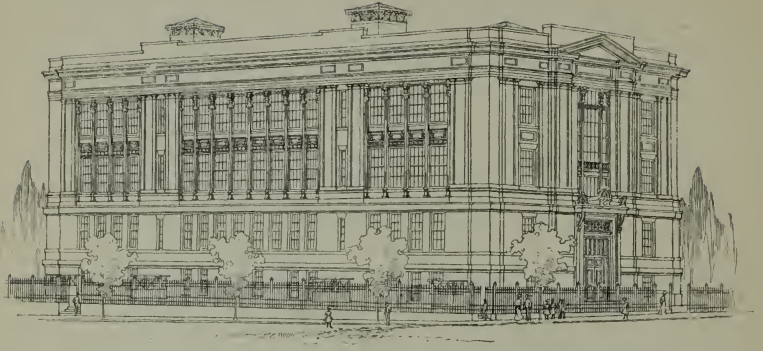
This schoolhouse is located on School street, West Roxbury. The building covers an area of 10,570 square feet and stands on a lot containing 35,491 square feet. The blind alley, Boylston place, comes up to the rear of the lot, and as the building was placed lengthwise on the lot to obtain the best exposure for the rooms, the architects have planned for a thoroughfare from Boylston place to School street. This leaves ample area for two playgrounds, while the building is completely surrounded with grass and trees. No attempt has been made to shut in the playgrounds, which, opening as they do from a foot-path which is a thoroughfare, are accessible at all times. It is distinctly an experiment whether such an open playground can be properly restricted in its use so that the privilege will not be abused and the property of the city not be injured. In connection with these accessible playgrounds the basement is so arranged that, if desired, the play-rooms, and even the toilets adjoining them, can also be left open without allowing the children access to other portions of the building.

The basement contains the play-rooms and toilets already referred to and the heating apparatus and coal storage. The children have two direct means of entrance to the basement, from which they can reach the first floor by three different staircases.

On the first floor there are six class-rooms, and it will be noted that each room has what the Commissioners consider the ideal arrangement, left-hand light, entrance door near the end where the teacher sits, the wardrobe at the same end, with double hung doors. In this school the experiment is being tried of dividing the toilet-rooms among the various stories instead of concentrating them in the basement, and advantage has been taken of the height of the two stories of class-rooms to obtain three stories, in the space occupied by the toilets, in the same height. Two of these floors are occupied by toilets and the other by the teachers' room and stock-room. The second-floor plan is the same as the first, containing six class-rooms.

The area of one floor is 10,520.41 square feet, and the area of the class-rooms on the same floor is 4,446 square feet. The cubical contents of the building are 517,035 cubic feet. The contracts amount to \$122,056, making a cost per cubic foot of \$0.23.

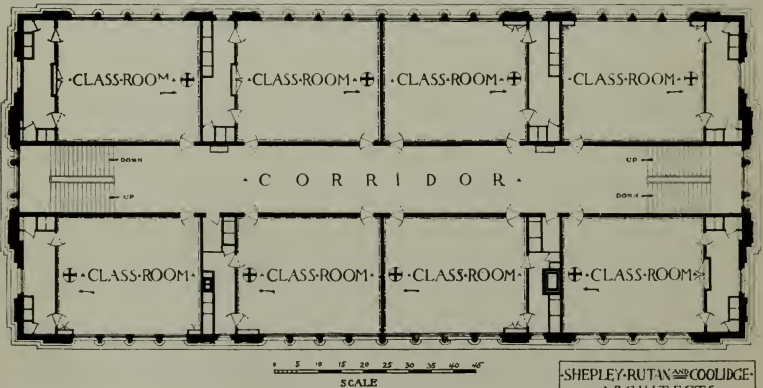
The construction is fireproof throughout. The outside walls and interior bearing walls are of brick, and the smaller partitions



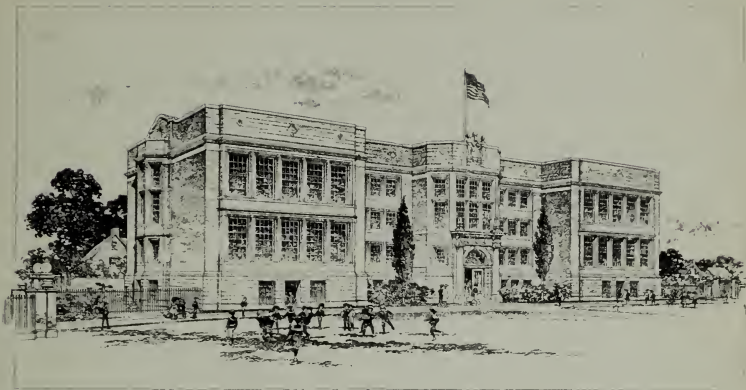
·GRAMMAR· SCHOOL ·IN THE·
·LOWELL·DISTRICT·
·HEATH·STREET·

NOTES

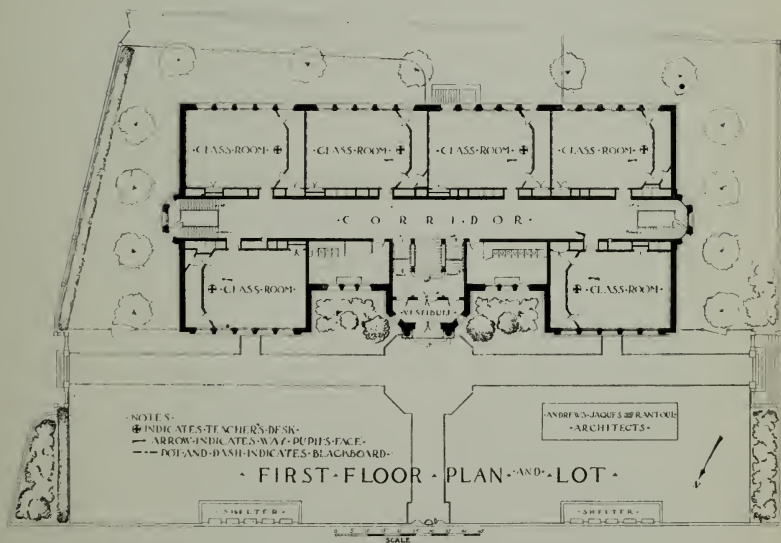
- ⊕ INDICATES TEACHER'S DESK
→ ARROW INDICATES WAY PUPILS FACE
- · - · DOT AND DASH INDICATES BLACKBOARD



·SECOND·FLOOR·PLAN·



• PRIMARY • SCHOOL • IN • THE •
• GEORGE • PUTNAM • DISTRICT •
• SCHOOL • STREET •



of terra-cotta. The floors are of steel frame with terra-cotta arches, and the roof of steel frame and asphalt composition roofing. The exterior of the building is of common red brick and limestone, the ornament being concentrated on the main central doorway and the bay over it.

Owing to the fact that the path in front of the school is a thoroughfare, as already referred to, the Commissioners felt justified in going to some expense in connection with the entrance to this thoroughfare, and the walls bounding the school-yard lot on this side; they have therefore included in the contract ornamental gates in brick and iron at either end, shelters with seats in the two playgrounds, and a drinking fountain on the playground wall in the centre. The whole of this work is included in the contract. Taken as a whole, this building conforms more nearly than any other thus far designed with the ideal of the Commissioners as to what a primary school building should be.

Heating and Ventilating.—System: For steam, gravity. For air, gravity.

Boilers: There are two 15-section No. 5½ Mills cast-iron sectional boilers provided for this building. There is also one 8-section No. 2 Mercer cast-iron sectional boiler for summer use.

Radiation: There is a total of 6,540 feet of radiation, divided into direct radiators, indirect gold-pin radiators and coils. Aspirating coils are placed in vent flues.

Temperature Control: The temperature of air in classrooms is to be controlled by the teachers by means of hand mixing-dampers. No automatic temperature control is provided.

Electric Work.—The building is wired for electric light, and fitted with electric programme clocks and with bells. There are 257 outlets, 441 lights, 13 clocks, and 18 bells.

Note.—All figures in regard to cost are subject to variation, as no building is complete, and changes may alter the cost. In all cases, however, the cost includes the complete building, with all trades, and all the grading, draining, paving, and planting of ground, in some cases covering a considerable area. No attempt has been made to separate the cost of the grounds from the cost of the building. In most of the buildings the contracts are divided, and under these circumstances a forfeiture contract is difficult to enforce, and therefore generally inadvisable. In one case, the primary building in the Christopher Gibson District on Westville street, there is a single contract and a forfeiture and bonus clause of \$20 a day.

In view of the urgent need of new schools the Commissioners have no hesitation in saying that it would be to the advantage of the city if all their contracts were on this basis. A single contractor assumes responsibility for all the trades, and exceptional ability or diligence on his part will earn him a bonus which it is well worth while for the city to pay.

TABLE SHOWING COMPARATIVE COST OF, AND ACCOMMODATION FURNISHED IN, EIGHT SCHOOLHOUSES (NOS. 1 TO 8)
BUILT BY THE SCHOOL COMMITTEE, AND SEVEN (NOS. 9 TO 15) ERECTED BY THIS DEPARTMENT.

NAME OF SCHOOL.	Capacity.	Cubic contents.	Cost.	Cost per cubic foot.	Area of rooms on one floor.	Area of class rooms on one floor.	Area of lot.	Area of building.	Notes.
(1.) South Boston High.....	702 pupils.	1,828,661	\$342,219	\$022.39	24,435	.....	79,646	25,467	First-class construction. Flat roof.
(2.) Dorchester High.....	970 pupils.	1,892,632	309,026	16.33	25,646	.....	56,870	25,857	First-class construction, except pitched roof which is plank, and contains 387,000 cu. ft. of partially finished space.
(3.) East Boston High.....	675 pupils.	1,161,301	270,040	23.26	19,274	.....	27,500	21,477	First-class construction. Flat roof.
(4.) West Roxbury High.....	400 pupils.	1,016,929	215,038	21.15	12,471	.....	47,901	12,664	This does not include cubic contents or cost of old building. Attic contains 184,026 cu. ft. of unfinished space.
(5.) Roger Wolcott.....	14 rooms. Grammar.	741,174	137,023	18.49	10,524	5,276	39,764	10,833	Second-class construction. Pitched roof, with 73,380 cubic feet partially finished.
(6.) Bigelow	19 rooms. Grammar.	828,515	174,892	21.11	12,951	6,552	26,704	13,365	Second-class construction. Pitched roof, with 33,106 cubic feet partially finished.
(7.) Winship.....	12 rooms. Primary.	525,578	126,178	24.01	9,949	4,648	34,365	10,475	Second-class construction. Pitched roof, with 106,143 cubic feet partially finished.
(8.) Chapman.....	16 rooms. Grammar.	753,303	124,836	16.58	11,712	6,423	29,150	12,131	First-class construction, except roof-frame and boarding.
(9.) Primary School, Christopher Gibson District, Westville street.....	15 rooms. Primary.	516,624	* 122,178	23.65	8,527	4,686	30,370	13,314	First-class construction, except roof-frame and boarding.
(10.) Grammar School, Roger Clap District, Columbia road	18 rooms. Grammar.	894,941	* 183,878	20.55	15,256	8,060	50,075	15,473	First-class construction, except roof-frame and boarding.
(11.) School-house, Phillips District, Norman street.....	32 rooms. Primary and Grammar.	1,300,792	* 319,720	24.58	13,732	6,446	24,889	17,937	First-class construction. Flat roof, with roof playground.
(12.) Primary School, Emerson District, Byron street.....	12 rooms. Primary.	510,386	* 122,916	24.08	9,821	4,786	17,500	10,249	First-class construction. Flat roof.
(13.) Primary School, Martin District, Kenwood rd.....	12 rooms. Primary.	652,630	* 148,761	23.79	12,190	4,607	27,923	12,312	First-class construction. Flat roof, except roof-frame and boarding.
(14.) Primary School Geo. Putnam District, School st.....	12 rooms. Primary.	517,035	* 122,056	23.61	10,520	4,646	35,491	10,872	First-class construction. Flat roof.
(15.) Grammar School, Lowell District, Heath street.....	19 rooms. Grammar.	856,777	* 214,065	24.98	12,132	6,612	38,215	12,292	First-class construction. Flat roof.

* These are all contract prices, which have in some cases, especially the Emerson and Lowell Districts, been materially reduced.



SHORT-HOPPER CLOSETS, WELLS SCHOOL, FOR GIRLS.

With slate partitions, approved ventilation, partitions and doors. Modified form has brass horizontal seat support in place of legs.



SLATE SINK, WELLS SCHOOL.

An approved form, without fountains.

APPENDIX II.

DESCRIPTION OF NEW SANITATION.

FIVE TYPICAL EXAMPLES.

WELLS SCHOOL, BLOSSOM STREET.—GRAMMAR SCHOOL FOR GIRLS.

Pupils' Closets.—The new sanitariums for this school are in a part of the basement and consist of twenty-four short hopper closets, put in according to the following specification :

Closets for pupils. — To be of short hopper type; bowls oval, of A-1 vitreous earthenware, porcelain finish, with raised local vent 13 square inches capacity, with cast-iron S or $\frac{1}{2}$ S trap, enamelled on the inside; connection between bowl and trap made with putty and white lead and fastened together with cast-iron double circular flange with brass bolts. Local vent to be connected to galvanized vent by nickel-plated copper pipe full area of vent on bowl. Pine tanks to be painted one coat of paint; lined with 16-ounce tinned copper; fitted with goose-neck syphon valve, with air breaker, high-pressure ball-cock and $\frac{3}{4}$ -inch pet-cock, fitted for $\frac{1}{2}$ -inch iron size brass pipes, and to extend within two inches of bottom of tank, iron extension lever, when extending through wood partition, to have finished brass plate, through which lever is to work, with extra heavy brass chain and ring; flush pipe to be $1\frac{1}{2}$ -inch brass tubing, with threaded ell at bottom and slip joints on bowl connection and bottom of tank, seat to be square front, of ash, with piece to wall, no covers, supported at back with wrought-iron knees fastened through slate partition to wood cleat on back of same with brass screws, front to be supported on $\frac{1}{2}$ -inch iron size brass pipe, with rough brass flange on ends, bolted to partition.

Water-closet partitions. — Build slate partitions, back, sides and ends, as shown on plans and details. Partitions to be 1 inch thick; bottom, top and butt joints sawed square and ground; the joints of backs to centre on partitions and to be reinforced with a 1 by 6-inch strip; to be secured at all angles by heavy polished brass knees and bolts; front of partitions to be secured by heavy brass straps bolted to slate and to $1\frac{1}{2}$ -inch iron pipe standards the full height of basement story with a flange bottom set 3 inches in concrete and a flanged top screwed to a 3 by 4-inch hard-pine piece, with bevelled edge and lag-screw to floor joists.

Teachers' and Janitor's Closets. — There were three plain wash-down closets for teachers and janitor placed in separate rooms in the building, the janitor's closet being in the basement and one closet for teachers' use on each of the next two floors above. These closets were put in according to the following specification :

Closets. — To be plain wash-down pattern made of A-1 heavy vitreous earthenware (porcelain finish); outlet to be $\frac{1}{2}$ S, rough brass bend, with connection joint in water; to have connection for seat ventilation of finished brass pipe through wall with brass flange and 13 square inches in area; to be fastened to floor with long square head finished brass lag-screws, with washer; to have a plain heavy hardwood seat (with cover) and to be hinged to earthenware with heavy finished brass post hinges.

Finished tanks. — To be supplied from plain hardwood tank 8 gal. capacity, lined with 16-ounce tinned copper, fitted with 1½-inch goose neck syphon valve with syphon breaker, galvanized-iron lever and extra heavy brass chain and plain pull ; with high pressure ball-cock of best make ; flush pipe to be 1½-inch polished brass pipe, 13 gauge, with slip joint connection at earthenware and rubber washer under tank ; flush pipe to have strong finished clamp and bumper securely fastened to wall.

Sinks. — There are four slate sinks and one galvanized-iron sink installed. The slate sink in the basement is supplied with a drinking font as per specification :

Sinks. — Material to be as specified under "Slate," to be of sizes shown with 1 ft. 6 in. back supported on heavy galvanized-iron scroll brackets ; to waste through a 6-inch brass cesspool into 1½-inch heavy finished brass S trap ; vent to be 1½-inch brass connected into main vent from waste. Use no union connections on sewer side of trap. To have one cock every 15 inches. Cocks to be wheel handle, self-closing and on pressure side of cock reduce water-way to prevent water splashing ; provide two cup hooks for each cock with lag-screw through slate into wood.

Drinking Fonts. — The specification for drinking font is as follows :

Stream fountains. — To be polished brass ; self-closing device ; to be 1 inch below top of sink and 6 inches across top ; supplied through ½-inch branch controlled by ½-inch key cock under each, fitted with union connections and wire gauze strainer as directed.

Lavatories. — The lavatories, of which there are two, one in the master's toilet and one in the teachers' toilet on first floor, are as specified :

Bowls. — To be 14 by 17 inches, bolted to slab, specified under "Marble," with finished brass basin bolts, fitted for two cock holes ; supported on finished brass brackets ; backs and ends to be ¾-inch thick ; each bowl to be fitted with cold water, cocks to be wheel-handle, self-closing of polished brass ; fitted with basin plug and chain, to waste through 1½-inch S trap with clean-out waste connection to wall, 1½-inch vent from crown of trap to general vent system ; piping and trap to be of polished brass.

Material. — All marble to be best white Italian, free from defects, stains, etc., to be well wrought, moulded, and exposed parts polished. All parts to be brass bolted and copper wired securely together and set in plaster of Paris.

Lavatory bowls. — To have tops 1½ inch thick, of sizes shown on plans, cut for size bowls specified, with rounded edge into same ; outside edges moulded, dished with holes cut in raised parts for securing basin cocks, plugs, and chains ; backs and ends to be 12 inches high with top edge bevelled.

General Description. — The cast-iron soil pipes, traps, fittings, and clean-outs are 4, 5 and 6-inch extra heavy pipe, the main lines being 6-inch decreasing to 4-inch on branches and on lines to catch-basins.

In the floors of sanitariums for pupils floor washes are placed, and the asphalt floors pitched toward them.





SLATE URINALS, PARKMAN SCHOOL, PRIMARY.
Approved form, with local ventilation, and without partitions.



ENAMEL-LINED AUTOMATIC WASH-DOWN LATRINES, PARKMAN SCHOOL.
Approved ventilation and partitions.

GRANT SCHOOL, PHILLIPS STREET.—PRIMARY SCHOOL.

Pupils' Closets. — One range of four seats of the enamelled-iron syphon range type was installed in a portion of the basement, according to the following specification :

Iron latrines. — Latrines will be enamelled-iron automatic syphon of approved design, with local vents equal in area to 13 square inches for each section, with hardwood seats with heavy finished brass hinges, with covers. The range to be flushed through brass perforated $\frac{3}{4}$ -inch pipes front and back, supplied from automatic iron flushing cistern of a capacity of eight gallons per seat, through cast-iron flushing pipe with double cast-iron outlet trap with air pipe to tank and brass clean-out in floor

Slate Partitions. — The slate partitions around latrines have already been described under Wells School.

Teachers' Closets and Urinals. — The teachers' closet and lavatory bowl are the same as those described under Wells School, and the urinal the same as in the Skinner School, described later, but 12 feet in length.

Slate Sinks. — There are four new slate sinks and one heavy galvanized-iron sink for janitor's use, put in as follows :

Furnish and set up four substantial slate sinks with 16-inch backs. The sinks are to be supported on heavy galvanized-iron brackets, scroll design; size of sinks, 20 inches by 30 inches by 6 inches, carefully rabbeted and secured together and drilled for supplies and wastes. Furnish brass chains and two aluminum drinking cups and nickel-plated brass chain to each and every sink. All compression cocks in connection with sinks to be wheel-handle pattern, self-closing, nickel-plated brass. Sinks to waste through 6-inch nickel-plated strainer into $1\frac{1}{2}$ -inch brass-cast rough trap. No union connections allowed. All joints to be rigid.

There is one heavy galvanized-iron sink for janitor's use, 18 by 36 inches, supported on galvanized-iron frame and legs, and fitted with new supply $\frac{3}{4}$ -inch hose-bibb cock, 4-inch side-screw trap and $1\frac{1}{2}$ -inch 4-pound lead waste and vent.

The new supply pipe system is of iron-size brass, of American Tube Works make.

PARKMAN SCHOOL, BROADWAY, SOUTH BOSTON.—PRIMARY SCHOOL.

General Description. — The new sanitariums for this school were placed in a new building in the yard, and consist of two ranges of wash-out type, having six seats each, a urinal thirty-one feet in length, one galvanized-iron sink and a lavatory bowl in teachers' room. The slate for water-closet partitions and urinals has already been described under "Scholars' Closets" in the Wells School, and "Urinals" in the Skinner School. The marble and lavatory bowls are given under "Lavatories" in description of Wells School.

Following is the specification for the enamelled-iron latrines and enamelled-iron sink:

Pupils' Sanitariums. — There will be two sets of enamelled-iron wash-out water-closet ranges with hardwood hinged seats, perforated brass

flushing pipes at front and back; wood tanks, lined with copper, cistern and brackets, copper flushing pipe with cast-iron outlet trap, and brass clean-out in floor. The ranges will consist of six seats each. Partitions, etc., to be as above specified.

Sinks. — Furnish and set up in same location as present sinks, which are all to be removed, three substantial, heavy enamelled cast-iron sinks with 16-inch backs; sinks to be supported on heavy galvanized-iron brackets, scroll design. These sinks are to be 17 inches by 24 inches by 6 inches. Furnish brass chains and two aluminum drinking cups to each and every sink. All compression cocks in connection with sinks to be of wheel pattern, self-closing, nickel-plated brass. Sinks to waste into 6-inch nickel-plated strainer into 1½-inch brass cast rough trap. No union connections allowed. All joints to be rigid.

SKINNER SCHOOL, FAYETTE STREET.—PRIMARY SCHOOL.

Pupils' Closets. — In this school, which accommodates both boys and girls, there were two new sanitariums put in in opposite ends of the basement. In the girls' side there are ten seats in one range, of the porcelain syphon type, as per following specification. In the boys' side was installed one range of same type and a urinal twelve feet in length.

Water-closet Ranges. — Furnish and set where shown on plans one range of ten seats and one range of six seats; to be porcelain water-closet range, with cast-iron partitions with adjustable standards; to have ventilating extension end and to have hardwood seats and covers, painted cast-iron flushing cisterns with brackets, flush-pipe, outlet trap and air-pipe, as per plate.

Urinals. — Provide and set where shown on plans, in best manner, in boys' sanitary, one slate urinal, as per detail; to be of best Monson slate or its equivalent, as may be approved. No ribbon or shalley slate will be allowed. All exposed surfaces to be planed and rubbed smooth; back and ends to be 1 inch thick, ploughed to receive ¾-inch flush-pipe, etc., and to have ¾-inch cap all around; exposed edges to be rounded; put together in best manner as to make tight joints in elastic cement; to be clasped and stayed with finished brass angles and screws, nickel-plated where exposed; also place a green slate trough, 6 inches by 16 inches, with 8-inch gutter, properly inclined to outlets, bedded in Portland cement. All slate joints to be rabbeted and backed with a piece of slate 3 inches wide; lay a floor-slab 23 inches wide by 1½ inches thick, planed smooth, surface flush and inclined with asphalt floor, so as to perfectly drain into gutter, with drip-moulding at gutter edge; support on 1-inch by 1-inch iron sleepers every two feet; the space between to act as vent-duct. At outlets of urinal trough fit 8-inch bell-crowned brass strainers with extra heavy brass connections to cesspool to a 3-inch running-trap having accessible brass clean-out. Make all the necessary connections with vent and sewer pipes. On the urinal provide and neatly place, with suitable supports, in firm position, where indicated, a flushing pipe of polished annealed brass pipe, perforated every ½ inch by smoothly bored openings for flushing urinal, supplied from ¾-inch iron-size brass pipe twice the length of flush-pipe, controlled by one valve; ends to be provided each with suitable air-cushion and stopped by screw plug; provide two wire brushes with sectional handles the full length of urinal flush-pipe. On the supply to flush-pipe provide a ¾-inch hose-bibbed key-handled cock.



PORCELAIN AUTOMATIC SIPHON RANGE, SKINNER SCHOOL.

With galvanized-iron partitions. The modified approved form has local ventilation from each section, and slate partitions.



CLOSETS, GEORGE PUTNAM SCHOOL.

An approved wash-down closet, with wood partitions. Slate partitions are now used instead.



DOUBLE URINAL, SHERWIN SCHOOL.

An approved double bank of slate urinals, with reutilation and without partitions; and drinking fountains.



SLATE URINALS, VENTILATED AT BOTTOM, BENNETT SCHOOL.

The partitions are of approved form, but are considered unnecessary and undesirable.

Slate Sinks.—There were eight new slate sinks installed—two in the basement and two on each of the three floors above. The specification for these sinks follows :

Slate sinks to be constructed, as shown on detail sheet, of best Monson slate or its equivalent, acceptable to the Commissioners. Each sink fitted with one $\frac{3}{4}$ -inch self-closing rabbet-ear hose-bibb nickel-plated cock, flange and nipple, except in basement, where each sink will have three cocks. Slate sinks to waste into brass cesspool through a 6-inch nickel-plated strainer with a $1\frac{1}{2}$ -inch iron-size nickel-plated brass waste into a 4-inch hand-made 8-pound lead pot trap provided with nickel-plated brass side-screw clean-out; fitted to make waste connections and set below water line of trap, which is to be vented from top into iron vent-pipe and to waste through 4-pound lead pipes into iron pipe. The flange of trap-screw to be of sufficient size to cover hole in slate. No factory-made traps will be allowed. Sinks in basement to be supported on galvanized-iron legs or brackets of selected design; provide on each sink two nickel-plated brass hooks with expansion bolts to hold drinking cups.

GEORGE PUTNAM SCHOOL, COLUMBUS AVENUE.

General Description.—The sanitariums for pupils in this school were placed in a building erected for the purpose, and consist of both boys' and girls' sanitariums. Pupils' closets are same as teachers', only without cover, the girls' having thirteen seats and the boys' ten seats and a urinal 19 feet 6 inches long. There were two wash-down closets put in, one in new master's room and one in new teachers' room.

Six slate sinks and one galvanized-iron sink for janitor's use were installed, and the master's and teachers' sanitariums each had one lavatory bowl. The specification for the various fixtures follows :

Water-closets.—To be plain wash-down pattern, made of A-1 heavy vitreous earthenware (porcelain finish); outlet to be $\frac{1}{2}$ S, rough brass bend, with connection joint in water; to have connection for seat-ventilation of finished brass pipe through wall, with brass flange, and 13 square inches in area; to be fastened to floor with long square-head finished brass lag-screws, with washer; to have a plain heavy hardwood seat (no cover), and to be hinged to earthenware with heavy finished brass post hinges.

Sinks.—Provide and set where shown, in secure manner, the several slate sinks. Those in the basement and other stories to be clear Monson slate; all to be made per detail, supported on brass legs on galvanized-iron brackets. To be supplied with water through nickel-plated rabbet-ear or other approved self-closing cocks, four each in the basement and two each in the stories above; attach to each cock a nickel-plated star filter with glass body. To waste through nickel-plated 6-inch cesspool strainer into $1\frac{1}{2}$ -inch iron-size brass waste and hand-made 8-pound lead-pot trap, 6 inches in basement and 4 inches in stories above; all to have nickel-plated side-screw clean-out, fitted to receive waste connections, set below the water line, and ventilated from top with $1\frac{1}{2}$ -inch 4-pound lead into iron-pipe waste. The trap-screw to be of proper size to cover the hole cut in the slate. Put under each sink and set in the floor a dish, slate slab, as shown. Provide and tightly secure by expansion bolts to back risers of the several sinks strong nickel-plated brass cup hooks, six each in the basement and four each in the stories above.

Janitor's Sink. — Put janitor's sink in basement, of heavy galvanized-iron, 18 inches by 36 inches by 6 inches, supported on galvanized-iron legs; provide the same with $\frac{3}{4}$ -inch brass hose bibb, 5-inch side screw-trap, and $1\frac{1}{2}$ -inch 4-pound lead waste properly trapped.

Urinal. — Provide and put up in best manner, where shown on plan, a slate urinal of the best Monson slate, having a trough of Matthews' Vermont green slate, 16 inches by 6 inches, properly inclined to outlets. Backs, ends, and cap of 1-inch rounded edges, floor slab $1\frac{1}{2}$ -inch by 23 inches, inclined to gutter, to rest firmly on tar-dipped iron sleepers 1 inch thick. Slate surfaces exposed are to be planed and sand-rubbed smooth, to be put together with brass clamps, standards and bolts. Floor and trough to be bedded in best Portland cement, joints rabbeted and made tight in elastic cement. The back slab to receive the flushing-pipe as shown. Near the centre of the urinal trough put in two 8-inch bell-crowned brass strainers, with extra deep brass cesspool, connected to two 3-inch running traps, having brass clean-out. Make connection with vent and sewer-pipe in a thorough manner. Properly secure in two sections a $\frac{3}{4}$ -inch annealed polished brass flushing-pipe, with smooth bored perforations every $\frac{1}{4}$ inch, free from rough edges inside, each end to have air-cushion stopped with brass screw-plug.

Lavatories. — Provide and set complete two lavatories with high back and end risers, and self-closing nickel-plated basin cocks for cold water.

Slate Sinks. — Provide and set in acceptable manner floor slabs under the lavatories of the first floor of suitable sized, dished, Italian marble, $1\frac{1}{2}$ inch thick, with 1-inch back and end risers, 24 inches in height.

Provide and place in proper manner under each water-closet in sanitarie, with edge to edge, neatly-jointed, dished floor slabs, $1\frac{1}{2}$ inch thick, 24 inches by 30 inches, with a 24-inch slate back-riser, 1 inch thick, the entire length of the water-closet back as indicated and directed, and each end as wide as the floor slab, the same to be rabbeted into the latter in careful manner and made tight. All to be of Monson or other approved clear slate; all holes neatly drilled and all surfaces, where exposed, to be planed smooth.

Note. — In the new sanitation described above an entirely new system of waste and supply pipes was installed. The soils, vents, traps, clean-outs and drains in each case were entirely new (except one vertical stack in the Skinner School) and of extra heavy cast-iron. The supplies, including pipe fittings, valves, shut-offs, etc., were entirely new and all of brass. The pipes of iron-size brass.

New fixtures were put in in all cases throughout, with the exception of one water-closet on the top floor of the Skinner School, and three teachers' closets in the Parkman School.

A list of expenditures for sanitation and plumbing will be found in Appendix III.

APPENDIX III.

 APPROPRIATION FOR LAND AND BUILDINGS
FOR SCHOOLS.

The following statement shows the expenditures on account of the above appropriation for the period July 1, 1901 to and including January 31, 1902, and for the full fiscal year February 1, 1902, to and including January 31, 1903:

<i>July 1, 1901, Appropriation</i>	.	.	.	\$1,000,000 00	
<i>Expended for Portable Buildings:</i>					
Nos. 13-60, erection, heating, furnishing	.	.	.	\$92,385 30	
Expended for Lewis Annex Building	.	.	.	1,874 50	
<i>Expended for Sanitation:</i>					
Atherton School	.	.	.	2,708 00	
Dudley School	.	.	.	660 00	
English High and Latin School,				1,923 00	
Francis Parkman School	.	.	.	115 00	
Franklin School	.	.	.	1,180 00	
George Putnam School	.	.	.	4,578 26	
Horace Mann School	.	.	.	1,990 00	
Hugh O'Brien School	.	.	.	361 00	
Lewis School	.	.	.	915 00	
Norcross School	.	.	.	7,718 92	
Old Gibson School	.	.	.	871 25	
Roger Clap School	.	.	.	1,371 00	
Smith-street School	.	.	.	375 20	
Wait School	.	.	.	9,824 52	
Winthrop School	.	.	.	288 00	
<i>Expended for fire extinguishers</i>	.			186 00	
<i>Expended for incidental expenses</i>				1,602 37	130,927 35
<i>Balance Appropriation February 1, 1902,</i>					\$869,072 65
February 1, 1902, Appropriation, additional	.			1,000,000 00	
January 1, 1903, Appropriation, additional	.			500,000 00	
<i>Expended for Portable Buildings:</i>					
Nos. 61-92, erection, heating, furnishing	.	.	.	\$68,613 33	
<i>Carried forward</i>	.	.	.	\$68,613 33	\$2,369,072 65

<i>Brought forward</i>	.	.	\$68,613	33	\$2,369,072	65
<i>Expended for Lewis Annex Building</i>	.	.	1,002	16		
<i>Expended for Sanitation:</i>						
Auburn School	.	.	4,302	63		
Atherton School	.	.	3,477	16		
Adams School	.	.	10,065	95		
Aaron Davis School	.	.	6,933	93		
Bennett and Bennett annex schools	.	.	17,582	29		
Chas. C. Perkins School	.	.	5,458	48		
Cook School	.	.	1,766	95		
Drake School	.	.	3,655	94		
Dwight School	.	.	7,542	91		
Emerson School	.	.	5,297	35		
Everett School	.	.	7,165	51		
Freeman School	.	.	180	37		
Florence-street School	.	.	2,568	25		
George Putnam School	.	.	9,683	75		
Grant School	.	.	3,887	31		
Harvard School	.	.	7,270	67		
Ira Allen School	.	.	2,745	05		
Lowell School	.	.	1,310	03		
Mayhew School	.	.	1,917	07		
Norcross School	.	.	6,882	36		
Phillips Brooks School	.	.	490	00		
Parkman School	.	.	7,111	33		
Quincy School	.	.	10,173	73		
Rutland-street School	.	.	6,026	43		
Roxbury High School	.	.	7,958	68		
Skinner School	.	.	5,222	68		
Sherwin School	.	.	8,966	43		
Tyler-street School	.	.	4,663	91		
Way-street School	.	.	7,124	11		
Wait School	.	.	174	71		
Wells School	.	.	6,617	27		
<i>Expended for Fire Escapes, etc.:</i>						
Auxiliary fire alarm, installation,			2,079	00		
Cook School, fire escape	.	.	1,076	00		
Hillside School, fire escape	.	.	972	00		
Fire extinguishers	.	.	3	25		
<i>Expended for additions to lots and erection of new buildings:</i>						
Extension Mechanic Arts High School:						
Site	.	.	\$12	00	12	00
Girls' High School, enlargement:						
Site	.	.	\$14,250	00	14,250	00
<i>Carried forward</i>	.	.	\$262,230	98	\$2,369,072	65

<i>Brought forward</i>	.	.	\$262,230 98	\$2,369,072 65
Grammar School, Lowell District :				
Site	.	.	<u>\$22,940 33</u>	22,940 33
Grammar School, Roger Clap District :				
Site	.	.	<u>\$26,750 00</u>	
Building	.	.	<u>37,679 55</u>	64,429 55
Primary School, Christopher Gibson District :				
Site	.	.	<u>\$9,111 00</u>	
Building	.	.	<u>50,795 57</u>	59,906 57
Primary School, Emerson District :				
Site	.	.	<u>\$12,050 00</u>	
Building	.	.	<u>2,796 97</u>	14,810 97
Primary School, Eliot and Hancock District :				
Site	.	.	<u>\$75 00</u>	75 00
Primary School, George Putnam District :				
Site	.	.	<u>\$13,841 49</u>	13,841 49
Primary School, Martin District :				
Site	.	.	<u>\$36,300 00</u>	
Building	.	.	<u>3,596 12</u>	39,896 12
Schoolhouse, Phillips District :				
Site	.	.	<u>\$60,244 11</u>	
Building	.	.	<u>9,001 65</u>	69,245 76
Savin Hill School, enlargement :				
Enlargement of building	.	.	<u>\$7,876 27</u>	7,876 27
Tuckerman School, enlargement :				
Site	.	.	<u>\$24,675 00</u>	24,675 00
<i>Expended for Additions to School Yards :</i>				
Hancock School	.	.		22,500 00
Old Christopher Gibson School	.	.		1,831 05
<i>Miscellaneous :</i>				
Boilers, English and Girls' High Schools	.	.		16,078 25
Engineering expenses	.	.		9,451 14
<i>Carried forward</i>	.	.	<u>\$629,788 48</u>	<u>\$2,369,072 65</u>

<i>Brought forward</i> . . .	\$629,788 48	\$2,369,072 65
Painting and whitewashing, and cleaning furniture for sanitary purposes	28,155 82	
Incidental expenses, including salaries, blue prints, station- ery, horse hire, engineering supplies, etc.	3,323 30	
Amount voted and set aside by the Schoolhouse Commissioners for New Sanitation, Fire Escapes, Payments for Lands taken, and for the Completion of Buildings under Contract	1,539,911 38	
	<hr/>	<hr/>
	\$2,201,178 98	\$2,369,072 65
		2,201,178 98
		<hr/>
<i>Balance unappropriated February 1, 1903.</i>		\$167,893 67

APPENDIX IV.

EXPENDITURES FOR RENTS, FURNITURE, RE- PAIRS, ALTERATIONS, AND EXPENSES OF THE COMMISSION.

I.

During the seven months from July 1, 1901, to January 31, 1902, the following sums were expended by the Schoolhouse Department for rents, furniture, repairs, alterations, and expenses of the Commission:

July 1, 1901, appropriation transferred to School- house Department by School Committee . . .	\$147,954 21	
Aug. 1, 1901, appropriation, additional . . .	27,000 00	
Dec. 1, 1901, appropriation, additional . . .	2,200 00	
Furniture	\$26,434 31	
Carpentry, lumber and hardware	19,686 24	
Heating apparatus	30,100 35	
Ventilation	2,163 25	
Masonry, paving, drains, etc.	6,381 74	
Rents and taxes:		
High Schools	\$5,872 90	
Grammar Schools	6,402 94	
Primary Schools	7,108 00	
Kindergartens	2,306 00	
	<hr/>	<hr/>
<i>Carried forward,</i> \$21,689 84	\$84,765 89	\$177,154 21

<i>Brought forward</i> , \$21,689 84	\$84,765 89	\$177,154 21
Manual Training		
Schools 2,200 00		
Evening Drawing		
Schools 1,370 00		
Offices for School-		
house Depart-		
ment, School-		
house Custodian,		
and Truant Officers, 1,252 08	26,511 92	
Painting and glazing	14,375 72	
Whitening and plastering	3,453 00	
Blackboards	2,439 25	
Locks and bells	1,210 86	
Roofing and gutters	5,559 78	
Iron fences and wire screen work,	917 64	
Asphalting	892 61	
Rubber stair treads	334 30	
Plumbing	4,707 14	
Gas-fitting and electric light fix-		
tures	7,330 93	
Cleaning buildings, including sup-		
plies	358 11	
Horse-shoeing, board and hire of		
horses, repairs of carriages,		
harnesses, etc.	1,137 50	
Salaries	15,845 09	
Printing, stationery and postage,	1,273 40	
Rent and care auxiliary fire-alarm		
boxes	2,606 44	
Cleaning vaults	84 00	
Flagstaffs, new, and care of old,	357 20	
Telephone and messenger service,	172 21	
Care of lawns	12 40	
Electric motors and engines	644 55	
Teaming	125 50	
Car fares and travelling expenses,	723 48	
Electric lighting	72 45	
Gymnasium apparatus	66 50	
Fire escapes and extinguishers, re-		
pairs	181 00	
Plans, blue prints and advertis-		
ing	6 49	
Disinfectants	979 30	
	<hr/>	
	\$177,144 66	
Jan. 31, 1902, balance transferred		
by City Auditor	9 55	
	<hr/>	
	\$177,154 21	\$177,154 21

SUBDIVISION OF EXPENSES.

Rents, salaries, furniture, repairs, and alterations in school buildings, July 1, 1901, to January 31, 1902.

Grammar Schools	\$61,178 15
Primary Schools	51,800 78
Miscellaneous	25,814 56
High Schools	16,714 60
Manual-Training Schools	8,096 32
Kindergartens	5,297 38
Evening Drawing Schools	4,693 09
Evening Elementary Schools	2,562 34
Deaf Mutes' School	987 44
	<hr/>
	\$177,144 66

II.

During the year February 1, 1902, to January 31, 1903, the following sums were expended by the Schoolhouse Department for rents, furniture, repairs, alterations, and expenses of the Commission:

Feb. 1, 1902, appropriation	\$366,800 00
Furniture	\$53,369 76
Carpentry, lumber and hardware,	60,963 40
Heating apparatus	41,537 45
Ventilation	1,395 77
Masonry, paving, drains, etc.	20,772 95
Rents and taxes:	
High Schools, \$8,751 80	
Grammar Schools, 11,294 01	
Primary Schools, 17,019 11	
Kindergartens, 5,273 00	
Manual-Training Schools	4,043 00
Evening Drawing Schools	2,698 00
Offices for Schoolhouse Department, Schoolhouse Custodian and Truant Officers	4,116 67
	<hr/>
Painting and glazing	53,195 59
Whitening and plastering	28,427 57
Blackboards	1,344 30
	<hr/>
	2,533 33
	<hr/>
<i>Carried forward</i>	\$263,540 12
	<hr/>
	\$366,800 00

<i>Brought forward</i> . . .	\$263,540 12	\$366,800 00
Locks and bells	2,206 89	
Roofing and gutters	17,764 42	
Iron fences and wire screen work,	3,158 29	
Asphalting	1,839 45	
Rubber stair treads	125 47	
Plumbing	11,672 86	
Gas-fitting and electric light fixtures	9,652 78	
Cleaning buildings, including supplies	1,617 65	
Horse-shoeing, board and hire of horses, repairs of carriages, harnesses, etc.	2,469 60	
Salaries	36,544 60	
Printing, stationery and postage,	2,810 95	
Rent and care auxiliary fire-alarm boxes	3,929 38	
Cleaning vaults	456 00	
Flagstuffs, new, and care of old,	1,472 32	
Telephone and messenger service,	654 76	
Care of lawns	135 75	
Electric motors and engines . . .	1,100 51	
Teaming	948 04	
Insurance on boilers	2,400 00	
Car fares and travelling expenses,	673 85	
Electric lighting	152 05	
Gymnasium apparatus	179 25	
Fire escapes and extinguishers, repairs	1,090 67	
Plans, blue prints, and advertising,	204 34	
	<hr/>	<hr/>
	\$366,800 00	\$366,800 00

SUBDIVISION OF EXPENSES.

Rents, salaries, furniture, repairs, and alterations in school buildings, February 1, 1902, to January 31, 1903.

Grammar Schools	\$120,139 29
Primary Schools	104,578 24
Miscellaneous	65,572 26
High Schools	41,878 82
Manual-Training Schools	14,326 44
Kindergarten Schools	10,694 86
Evening Drawing Schools	3,871 91
Evening Elementary Schools	3,544 50
Deaf Mutes' School	2,193 68
	<hr/>
	\$366,800 00

III.

Expenditures on school buildings, from July 1, 1901, to January 31, 1903.

GENERAL REPAIRS, RENTS, AND TAXES.

SOUTH END AND BACK BAY.

Appleton street	\$1,488 81	
Charles C. Perkins	2,829 81	
Cook	1,215 89	
Dwight	2,172 34	
English High	7,278 72	
Everett	2,211 03	
Franklin	4,498 68	
Girls' High	13,813 79	
Horace Mann	3,181 12	
Joshua Bates	919 52	
Mechanic Arts High	8,242 98	
Normal	2,374 05	
Prince	3,517 39	
Public Latin	3,755 90	
Rice	2,688 71	
Rutland street	1,470 08	
West Concord street	2,798 21	\$64,457 03

CITY PROPER.

Andrews	\$2,282 78	
Brimmer	3,439 03	
Pierpont	190 22	
Quincy	6,469 38	
School Committee building .	2,251 12	
Skinner	1,559 00	
Tyler street	1,432 91	
Way street	1,482 21	
Wait	2,346 31	
Winthrop	4,626 24	26,079 20

NORTH AND WEST ENDS.

Baldwin	\$494 33	
Bowdoin	2,321 63	
Cushman	2,062 92	
Eliot	3,429 54	
Emerson	1,936 46	
Freeman	566 31	
<i>Carried forward</i>	\$10,811 19	\$90,536 23

<i>Brought forward</i>	.	.	\$10,811	19	\$90,536	23
Grant	.	.	.	609	51	
Hancock	.	.	.	3,560	31	
Mayhew	.	.	.	1,554	06	
North Margin street	.	.	.	225	45	
Phillips	.	.	.	2,646	45	
Paul Revere	.	.	.	1,653	66	
Pormort	.	.	.	904	33	
Sharp	.	.	.	1,789	30	
Somerset street	.	.	.	1,726	06	
Wells	.	.	.	2,586	44	
Winchell	.	.	.	4,123	02	
Ware	.	.	.	629	48	32,819 26

ROXBURY, EAST OF COLUMBUS AVENUE.

Aaron Davis	.	.	.	\$1,662	58	
Abby W. May	.	.	.	635	11	
Albert Palmer	.	.	.	1,151	59	
Bartlett street	.	.	.	845	53	
Dearborn	.	.	.	2,055	97	
Dillaway	.	.	.	2,472	61	
Dudley	.	.	.	5,961	78	
George Putnam	.	.	.	2,085	62	
George street	.	.	.	897	51	
Howard avenue	.	.	.	1,243	57	
Howard avenue Annex	.	.	.	91	02	
Hugh O'Brien	.	.	.	4,121	27	
Hugh O'Brien Annex	.	.	.	23	65	
Hyde	.	.	.	3,230	07	
Lewis	.	.	.	5,643	78	
Lewis Annex	.	.	.	1	90	
Mt. Pleasant avenue	.	.	.	746	29	
Old Roxbury High	.	.	.	1,799	15	
Phillips Brooks	.	.	.	3,225	60	
Quincy street	.	.	.	1,183	36	
Roxbury High	.	.	.	3,606	53	
Roxbury street	.	.	.	1,172	37	
Roxbury Court House	.	.	.	64	00	
Sherwin	.	.	.	4,894	21	
School street	.	.	.	212	78	
Thornton street	.	.	.	2,441	59	
W. L. P. Boardman	.	.	.	2,895	39	
William Bacon	.	.	.	1,524	27	
Weston street	.	.	.	1,801	02	
Williams	.	.	.	261	26	
Winthrop street	.	.	.	406	24	58,357 62
<i>Carried forward</i>	.	.	.	.	.	\$181,713 11

Brought forward \$181,713 11

ROXBURY, WEST OF COLUMBUS AVENUE.

Comins	\$2,796 87	
Cottage place	1,930 74	
Heath street	550 60	
Ira Allen	257 25	
Lowell	7,156 18	
Lowell Annex	327 08	
Lucretia Crocker	1,570 47	
Martin	3,654 93	
Old Ira Allen	99 26	
Phillips street	1,199 53	
Smith street	692 46	
Wyman	1,177 57	21,412 94

JAMAICA PLAIN AND WEST ROXBURY.

Agassiz	\$1,596 21	
Baker street	491 60	
Bowditch	1,193 38	
Canterbury street	300 81	
Charles Sumner	3,612 02	
Chestnut avenue	496 34	
Francis Parkman	650 17	
Florence	396 30	
Hillside	826 16	
Longfellow	3,159 33	
Margaret Fuller	1,131 12	
Mt. Vernon	909 30	
Old Agassiz	320 14	
Old Baker street	565 75	
Poplar street	5 00	
Phineas Bates	323 10	
Robert G. Shaw	1,090 02	
Stephen M. Weld	1,235 18	
Washington street (Forest Hills),	520 79	
Washington street (German-		
town)	473 23	
West Roxbury High	2,639 13	21,935 08

SOUTH BOSTON.

Benjamin Pope	\$1,528 78	
Benjamin Dean	715 40	
Bigelow	100 25	
Capen	2,099 07	
<i>Carried forward</i>	\$4,443 50	\$225,061 13

<i>Brought forward</i>	.	.	\$4,443	50	\$225,061	13
Choate Burnham	.	.	758	17		
Clinch	.	.	1,205	71		
Cyrus Alger	.	.	694	54		
Drake	.	.	1,001	05		
Fourth street	.	.	156	75		
Gaston	.	.	2,132	99		
Hawes Hall	.	.	605	15		
John A. Andrew	.	.	1,751	76		
Lawrence	.	.	2,113	39		
Lincoln	.	.	2,698	53		
Norcross	.	.	1,710	68		
Old Parkman	.	.	737	25		
Parkman	.	.	1,535	52		
Samuel G. Howe	.	.	1,285	63		
Shurtleff	.	.	3,397	25		
South Boston High	.	.	1,220	87		
Simonds	.	.	145	79		
Thomas N. Hart	.	.	2,297	01		
Ticknor	.	.	1,139	27		
Tuckerman	.	.	279	89		
					31,310	70

DORCHESTER.

Adams street	.	.	\$557	64		
Atherton	.	.	3,222	82		
Benjamin Cushing	.	.	752	47		
Bailey street	.	.	491	29		
Bailey street Annex	.	.	60	25		
Bon Homme Richard	.	.	267	05		
Christopher Gibson	.	.	2,203	26		
Dorchester avenue	.	.	496	04		
Dorchester High	.	.	279	41		
Edward Everett	.	.	2,401	83		
Gilbert Stuart	.	.	1,751	04		
Glenway	.	.	529	31		
Harbor View street	.	.	875	80		
Harris	.	.	1,450	20		
Henry L. Pierce	.	.	1,418	98		
Little Em'ly	.	.	5	50		
Lyceum Hall	.	.	1,679	44		
Mather	.	.	2,276	40		
Mayflower	.	.	171	19		
Mary Hemenway	.	.	2,676	95		
Minot	.	.	2,480	70		
Morton street	.	.	1,659	72		
Morton street Annex	.	.	352	12		
Old Dorchester High	.	.	2,254	31		
Old Everett	.	.	793	67		
<i>Carried forward</i>	.	.	\$31,107	39	\$256,371	83

<i>Brought forward</i>	.	.	\$31,107 39	\$256,371 83
Old Gibson	.	.	2,053 50	
Old Gibson Annex	.	.	78 25	
Old Mather	.	.	921 93	
Quincy street	.	.	271 70	
Roger Wolcott	.	.	1,108 72	
Roger Clap	.	.	4,865 65	
Savin Hill	.	.	1,366 86	
Stoughton	.	.	396 86	
Thetford avenue	.	.	1,242 61	
Tileston	.	.	1,385 11	
Walnut street	.	.	950 84	
Ward-room Building	.	.	27 70	45,777 12

CHARLESTOWN.

Adams and Chestnut streets	.	.	\$535 18	
Bunker Hill Grammar	.	.	3,710 73	
Bunker Hill Primary	.	.	527 38	
Benjamin F. Tweed	.	.	2,118 95	
Charlestown High	.	.	904 18	
Common street	.	.	271 83	
Chauncy place	.	.	168 92	
Cross street	.	.	16 15	
Frothingham	.	.	1,691 93	
Frothingham Annex	.	.	50 13	
Harvard	.	.	3,616 80	
Harvard Hill	.	.	436 95	
Mead street	.	.	454 61	
Medford street	.	.	320 37	
Polk street	.	.	676 89	
Prescott	.	.	1,545 70	
Prescott Annex	.	.	66 02	
Warren	.	.	2,595 33	
Warren Primary	.	.	194 89	
William H. Kent	.	.	713 27	20,616 21

EAST BOSTON.

Adams	.	.	\$4,056 71	
Austin	.	.	1,805 30	
Blackinton	.	.	2,010 11	
Chapman	.	.	673 25	
Cudworth	.	.	2,217 29	
East Boston High	.	.	224 22	
Emerson	.	.	2,103 63	
Lyman	.	.	5,757 92	
Noble	.	.	1,526 90	
Noble Annex	.	.	65 85	

<i>Carried forward</i>	.	.	\$21,441 18	\$322,765 16
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<i>Brought forward</i>	.	.	\$21,441 18	\$322,765 16
Old East Boston High	.	.	1,225 45	
Plummer	.	.	999 42	
Tappan	.	.	646 11	
Webb	.	.	<u>1,180 69</u>	\$25,492 85

BRIGHTON.

Aberdeen	.	.	\$132 10	
Auburn	.	.	1,608 73	
Bennett	.	.	1,536 43	
Bennett Annex	.	.	1,659 62	
Brighton High	.	.	7,833 46	
Everett	.	.	357 61	
Frederick A. Whitney	.	.	774 97	
Harvard	.	.	484 53	
Hobart Street	.	.	812 82	
Old Brighton High	.	.	38 35	
Oak Square	.	.	729 03	
Old Oak Square	.	.	20 75	
Old Winship	.	.	79 87	
Union Street	.	.	147 11	
Washington Allston	.	.	1,563 43	
Washington Allston Annex	.	.	1,288 42	
William Wirt Warren	.	.	968 83	
Winship	.	.	<u>121 37</u>	20,157 43
Portable buildings	.	.	.	2,650 51
Incidentals not chargeable to any one school	.	.	.	<u>74,713 66</u>

HIRED BUILDINGS, RENTS, AND REPAIRS.

Athenæum building	.	.	\$1,278 90	
Byron court, No. 23	.	.	702 79	
Beech-street lot	.	.	2 00	
Bennington Street Chapel	.	.	1,104 85	
Broadway, No. 732	.	.	3,464 00	
Boylston Chapel	.	.	25 00	
Boylston street, No. 120	.	.	8,867 16	
Church of Redeemer	.	.	1,381 50	
Columbus avenue, No. 147	.	.	2,114 21	
Columbus avenue, No. 1448	.	.	70 00	
Centre street, Dorchester	.	.	345 00	
Centre street, Jamaica Plain	.	.	166 00	
Centre street, No. 341	.	.	757 00	
Chambers street, No. 33	.	.	1,466 34	
Chambers street, No. 38	.	.	1,955 73	
Colonial building	.	.	922 38	
Chauncy Hall	.	.	14,663 16	
Dahlgren Hall	.	.	<u>1,088 30</u>	
<i>Carried forward</i>	.	.	\$40,374 32	\$445,779 61

<i>Brought forward</i>	.	.	\$40,374 32	\$445,779 61
Day's Chapel	.	.	60 20	
Dayton avenue, No. 1	.	.	902 50	
Dudley street, No. 606	.	.	175 00	
G. A. R. building, E street	.	.	1,468 60	
Eliot street, Jamaica Plain	.	.	450 00	
Glenway street, No. 58	.	.	1,367 75	
Greenwood Hall	.	.	840 90	
Gay Head and Centre street	.	.	2,644 35	
Heath street, No. 179	.	.	798 17	
Heath street, No. 255	.	.	72 00	
Huntington avenue, No. 737	.	.	1,071 43	
Huntington avenue, No. 741	.	.	1,063 01	
Huntington avenue, No. 766	.	.	1,165 90	
Huntington avenue, No. 908	.	.	1,102 45	
Hewlett street, No. 17	.	.	382 50	
Lauriat avenue, No. 170	.	.	961 50	
Mt. Vernon street, No. 20	.	.	2,141 01	
Moon street	.	.	12,306 01	
Milton avenue	.	.	280 00	
Methodist chapel	.	.	941 35	
North Russell street, No. 31	.	.	5,211 65	
Princeton and Shelby streets	.	.	324 31	
Parmenter street, No. 20	.	.	2,653 00	
Parmenter street, No. 32	.	.	704 12	
Parker street, No. 974	.	.	483 33	
Stevenson block	.	.	705 00	
Saratoga street, No. 399	.	.	512 00	
Shawmut avenue, No. 124	.	.	1,021 05	
Standish street, No. 18	.	.	1,132 00	
South Baptist Church	.	.	916 45	
Tremont street, No. 1508	.	.	948 75	
Tremont street, No. 1518	.	.	1,016 87	
Tremont street, No. 1520	.	.	314 83	
Tremont street, No. 1634	.	.	1,036 40	
Tremont street, No. 276	.	.	3,915 93	
Trenton street, Charlestown	.	.	8 50	
Tomfohrde Hall	.	.	400 00	
Unitarian Church, Roslindale	.	.	924 39	
Ward-room, Ward 22	.	.	200 00	
Washington street, No. 323	.	.	649 67	
Walk Hill street, No. 727	.	.	269 50	
Washington street, No. 2307	.	.	4,185 12	
West Broadway, Nos. 324-6-8,	.	.	72 23	98,165 05
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Total	.	.	.	\$543,944 66

APPENDIX V.

APPROPRIATION FOR SCHOOLHOUSES.

The following statement shows the expenditures on account of the above appropriation for completing and furnishing school-houses turned over to the Schoolhouse Department by the School Committee, February 11, 1902 :

February 11, 1902, balance of appropriation transferred by School Committee to Department	\$206,290 35
Appropriation, additional	90,000 00

Expended on Buildings :

Bigelow School	\$39,784 30	
Chapman School	611 97	
Dorchester High School	5,640 10	
East Boston High School	14,392 64	
Gilbert Stuart School	1,291 83	
Ira Allen School	9,460 19	
Mechanic Arts High School	3 00	
Roger Wolcott School	25,578 73	
South Boston High School	25,663 28	
Warren Primary School	212 50	
Winship Primary School	16,997 70	\$139,636 24

Expended on Furnishings :

Bigelow School	\$11,954 86
Chapman School	833 10
Dorchester High School	4,251 53
East Boston High School	629 25
Ira Allen School	816 15
Mechanic Arts High School	1,391 91
Roger Wolcott School	16,108 90

<i>Carried forward,</i>	\$35,985 70	\$139,636 24	\$296,290 35
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<i>Brought forward,</i>	\$35,985 70	\$139,636 24	\$296,290 35
South Boston High School . . .	2,471 65		
Warren Primary School . . .	194 74		
West Roxbury High School . . .	630 11		
Winship Primary School . . .	2,969 52	42,251 72	
<i>Expended on Sites:</i>			
Bigelow School, additional . . .	\$8,093 00		
Hancock School, additional to lot . . .	21,525 00		
Paul Revere School, site . . .	67,015 78		
William H. Kent School, site . . .	5,300 00	101,933 78	
		\$283,821 74	\$296,290 35
			283,821 74
<i>Balance of Appropriation February 1, 1903,</i>			* \$12,468 61

* As against this amount, there are contracts outstanding in excess of this balance, and the buildings above referred to are not yet completed.

APPENDIX VI.

HIRED BUILDINGS.

The following rooms have been hired for school purposes. Rents, taxes, and water rates paid for the same, and for the offices of the Schoolhouse Department, the Schoolhouse Custodian, and the Truant Officers, amounting to \$53,195.59 during the year from February 1, 1902, to January 31, 1903.

For	Location.	Remarks.
Comins District.....	Tremont street, 1518.....	Rent per annum, \$600, including heat and janitor.
Comins District Kindergarten..	Germania Hall, 1448 Columbus avenue.....	Rent per annum, \$720 from November 20, 1902, including heat and janitor.
Christopher Gibson District....	Glenway street, 58, Dor....	Rent per annum, \$720, including heat and janitor.
Christopher Gibson District Kindergarten	Greenwood Hall, Dor.....	Rent per annum, \$600 including heat and janitor.
Christopher Gibson District....	Standish street, 18, Dor....	Rent per annum, \$720, including heat and janitor; city pays water rates.
Christopher Gibson District....	Washington street, 323, Dor.	Rent per annum, \$360, also heat, water rates and janitor.
Dearborn District.....	Dayton avenue, 1.....	Rent per annum, \$600, including heat and janitor.
Ellot District.....	Moon street, St. John's Parochial School.....	Rent per annum, \$8,040, including heat; city pays janitor and water rates.
Emerson District.....	Bennington-street Chapel, East Boston.....	Rent per annum, \$672, including heat; city pays janitor.
Emerson District Kindergarten,	Princeton and Shelby streets, East Boston.....	Rent per annum, \$300 from October 20, 1902, not including heat or janitor.
Emerson District.....	Saratoga street, 339, E. B...	Rent per annum, \$300, not including heat or janitor.
Evening Drawing School.....	Columbus avenue, 147.....	Rent per annum, \$1,300, not including heat or janitor.
Evening Drawing School.....	Svenson Block, E. Boston,	Rent per annum, \$940; vacated April 1, 1902.

HIRED BUILDINGS.— *Continued.*

For.	Location.	Remarks.
Evening Drawing School.....	Washington street, 2307, Dorchester.....	Rent per annum, \$1,000, not including water, rates, heat or janitor.
Gaston District.....	Pilgrim Hall, Broadway, 732, South Boston.....	Rent per annum, \$2,400, to October 1, 1902, then \$1,680 from October 1, 1902, in- cluding heat and janitor.
Gaston District Kindergarten..	Church of the Redeemer, South Boston.....	Rent per annum, \$340, including heat and janitor.
George Putnam District Kinder- garten.....	Byron court, 23, Roxbury...	Rent per annum, \$360, including janitor; not including heat or water rates.
George Putnam District.....	Tomfohrde Hall, Boylston Station	Rent per annum, \$400, including heat and water rates; city pays janitor.
Girls' Latin School.....	Chauncy Hall, Copley sq...	Rent per annum, \$6,000 to July 1, 1903; from then, \$7,000, not in- cluding heat, water rates or janitor.
Hancock District Kindergarten, also Grammar and Primary..	Parmenter street, 20, North End Union.....	Rent per annum, \$1,900, including heat and janitor. One room was vacated for two months.
Hancock District.....	Parmenter street, 32.....	Rent per annum, \$400, including heat and janitor.
Henry L. Pierce District.....	Milton avenue, 86, Dor.....	Rent per annum, \$336; vacated May 1, 1902.
John A. Andrew District Kin- dergarten	Methodist Chapel, Vinton street, South Boston.....	Rent per annum, \$600 to September 1, 1902, then \$660, including heat, but not janitor.
Lincoln District.....	South Baptist Church, East Fourth street, S. Boston..	Rent per annum, \$600, including heat and janitor.
Longfellow District Kinder- garten and Primary.....	Beech street, Phineas Bates Portable Building.....	Rent per annum, \$1, for use of land only.
Longfellow District.....	Hewlett street, 17	Rent per annum, \$240, not including heat or janitor.
Longfellow District Kinder- garten and Primary.....	Unitarian Church, Ros.....	Rent per annum, \$600, including heat and janitor.
Lowell District.....	Gay Head and Centre sts., Roxbury	Rent per annum, \$960, including water.
Lowell District.....	Centre street, 341, Jamaica Plain	Rent per annum, \$480, not including heat, water or janitor.
Lowell District.....	Parker street, 974.....	Rent per annum, \$300; vacated Nov. 5, 1902.

HIRED BUILDINGS. — *Continued.*

For.	Location.	Remarks.
Lowell District.....	Heath street, 179.....	Rent per annum, \$420, includes heat and janitor, not water rates.
Lowell District Kindergarten ..	Heath street, 255.....	Rent per annum, \$720, including heat and janitor.
Manual Training School.....	E street, South Boston, G. A. R. Building.....	Rent per annum, \$1,900, including heat and janitor; vacated Oct. 31, 1902.
Manual Training School.....	Tremont street, 1508.....	Rent per annum, \$600, including heat and janitor.
Manual Training School.....	Elliot street, Jamaica Plain.	Rent per annum, \$300, including heat and janitor.
Manual Training School.....	Walk Hill street, 727.....	Rent per annum, \$360, including heat and janitor; vacated May 1, 1902.
Martin District.....	Tremont street, 1520.....	Rent per annum, \$720, from Sept. 12, 1902, including heat and janitor.
Martin District.....	Tremont street, 1634.....	Rent per annum, \$900, including heat and janitor; vacated Aug. 1, 1902.
Martin District.....	Huntington avenue, 737.....	Rent per annum, \$660, including heat and janitor; city pays water rates.
Martin District.....	Huntington avenue, 741.....	Rent per annum, \$696, including heat and janitor; city pays water rates.
Martin District.....	Huntington avenue, 766.....	Rent per annum, \$780, including heat and janitor.
Martin District.....	Huntington avenue, 908.....	Rent per annum, \$720, including heat and janitor.
Roger Clap District.....	Mt. Vernon street, 20, Dor..	Rent per annum, \$1,200, not including heat, water or janitor.
Roger Clap District.....	Winthrop Hall, Upham's Corner	Rent for one day for graduation exercises, \$15.
Roger Clap District.....	Athenæum Building, East Cottage street, Dorchester,	Rent per annum, \$800, not including heat or janitor; city pays water rates.
Tileston District Kindergarten.	Lauriat avenue, 170, Dor....	Rent per annum, \$600, will be \$700 per annum from Jan. 1, 1903, includes heat, water and janitor.
Walt District.....	Shawmut avenue, 124.....	Rent per annum, \$600; vacated Nov. 15, 1902.

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HIRED BUILDINGS. — *Concluded.*

For.	Location.	Remarks.
Wells District.....	North Russell street, 31....	Rent per annum, \$2,300 to Sept. 6, 1902, and \$4,500 from Sept. 6, 1902, includes heat, light and janitor.
Wells District.....	Chambers street, 33.....	Rent per annum, \$800, not including heat or janitor; city pays one-half cost of gas.
Wells District Kindergarten....	Chambers street, 38.....	Rent per annum, \$1,080, including heat, janitor and water rates.
Office Schoolhouse Custodian...	Colonial Building, 100 Boylston street, room 620.....	Rent per annum, \$250, including heat and janitor.*
Office Schoolhouse Department,	276 Tremont street.....	Rent per annum, \$2,000; vacated May 1, 1902.*
Office Schoolhouse Department,	Walker Building, 120 Boylston street.....	Rent per annum, \$4,200, from May 1, 1902.
Office Truant Officer.....	276 Tremont street.....	Rent per annum, \$400, including heat, not janitor.

* Rental of these offices payable by School Committee from January 1, 1903.

APPENDIX VII.

NOTES ON SCHOOLS IN OTHER CITIES.

The Schoolhouse Commissioners, before undertaking the construction of the large number of school buildings required to furnish the necessary school accommodation in Boston, thought it expedient to visit other cities and study the methods adopted, so far as schoolhouses are concerned; and as the ordinary routine work of the department was progressing favorably, and the Commissioners were awaiting action of the School Committee, without which no buildings can be undertaken, it seemed advisable to take the matter up at once. Accordingly the Commissioners left Boston on Wednesday, October 9, and returned on Thursday, October 24, 1901. During that time they examined school buildings in New York, Philadelphia, Washington, St. Louis, Toledo, Cleveland, Buffalo, and Rochester.

They undertook in each case to get in touch with the officials directly concerned in the construction and repairs of school buildings, and in almost every city visited they had extended interviews with these parties, and discussed many questions relating to the work in hand.

It should be stated in a general way at the outset, that in no city visited are the conditions exactly similar to those confronting the Commissioners in Boston. Here we have the school buildings divided practically as follows: primary buildings for the accommodation of both boys and girls; grammar buildings for boys and grammar buildings for girls; high schools for boys and high schools for girls, — at least in the city proper. While in most all of the cities visited there are but substantially two classes of buildings, namely, grammar schools for both boys and girls (including in the same building those which in Boston are put in primary buildings), and high schools for both girls and boys. It is also true that in most cities visited the building laws are much less stringent than in this city.

From this it will be seen that schoolhouses, taken as a whole, can be built and maintained more cheaply where the different grades are combined in one building, and where less fireproof construction is required, and where the general requirements of the building laws are less severe.

In every city visited we found a very great interest expressed in the schoolhouse problem, and all parties endeavoring to secure the best and largest accommodations for the least expenditure of money; but it was claimed there were insufficient funds at their disposal to meet properly the demands made upon them. We found that in all the larger cities visited there are at the present time insufficient accommodations to allow each child of school

age to have a full day's attendance at school. In many places it was necessary to give part of the children instruction in the morning and another part in the afternoon; thus using the same accommodations twice, and giving one half day's instruction to each division.

After a careful examination, and making many inquiries, we came to the conclusion that the best results are obtained where there is the least political influence brought to bear upon the school question.

New York. — In New York City we visited the officers of the Board of Education and, on the recommendation of Mr. John Jasper, Borough Superintendent of Schools, visited grammar schools on 103d street, on 119th street and Madison avenue, Scammel and East Broadway, Grand street, and the high school on 115th street. In New York there is one Schoolhouse Architect, who supervises or prepares all plans; and in carrying out his policy one general scheme of buildings has been adopted, including style of architecture, heating, ventilation, and arrangement of rooms, both in the new buildings and, so far as possible, in those which have been remodelled. It has been decided that it is more economical to acquire lots in the middle of blocks than to purchase corner lots, that land can be purchased much more reasonably in this way, and that the buildings can be so planned that they will not be affected by the erection of other and possibly taller buildings adjacent to the schoolhouse sites. To accomplish this, what is known as the "H type" of building has been adopted, in which the outer sides are simply blank walls, with all the rooms opening either toward the street or upon the two courtyards formed by using the H plan. In general the corridors run along the blank walls and are lighted by putting glass in the doors of the school-rooms and by sashes in the upper part of the walls separating the school-rooms from the corridors. Most of the buildings are very large, some of them containing as many as fifty-six classes, one building being used for all grades of pupils. Almost all are built of light brick with light stone base-courses and terra-cotta trimmings.

No land is taken for play-yards in addition to the areas included within the lines of the building. The first floor in all buildings is occupied for play-rooms except what is required for the installation of the heating and ventilating plant and sanitariums. This is true even of some buildings which have been erected on corner lots, where the two exterior walls of the buildings are placed on the sidewalk line.

In two of the buildings visited play-rooms are provided in the upper part of the buildings. In one what is known as a "roof garden" has been adopted, made by putting a waterproof flooring over the entire top of the building, and carrying up the external walls about six or seven feet above the line of the roof. In order to enable the children to play games of certain kinds a wire netting is stretched upon a light framework over the entire top of the building and connected with the top of the external

1886	Lawrence	G.	Lawrence	Brick, 4 "	B st., S. B.	14,343	11,094 50	5,478	14,300	40,000	728	42,334 46		
1888	Lewis	G.	Lewis	Brick, 4 "	Dale st., Rox.	27,850	4,174 35	6,504	13,900	60,000	672	64,784 71		Alden Frink.
1891	Lewis Annex	M.		Frame, 1 Story	Dale st., Rox.				Lewis Lot.		56			School Department.
1889	Lincoln	G.	Lincoln	Brick, 8 Stories	Broadway, S. B.	21,500		5,620	25,300	20,000	728	48,278 80		Gridley J. F. Bryant.
1895	Little Emily	P.	Mary Hemenway	Frame, 1 Story	Adams st., Dor.				Harris Lot.		588			School Department.
1897	Longfellow	G.	Longfellow	Brick, 3 Stories	Hewlett and South sts., Bos.	20,040		7,700	5,400	78,000	560	75,423 91	0.17	Walker & Kimball.
1874	Lowell	G.	Lowell	Brick, 3 "	310 Centre st., Rox.	35,241	20,750 00	10,620	22,000	37,000	784			
1896	Lowell Annex	G.	Lowell	Frame, 1 Story	Mozart st., Rox.				Lowell Lot.		1,060	2,500	112	School Department.
1884	Lucretia Crocker	P.	Lowell	Brick, 2 Stories	Parker st., Rox.	30,000		5,405	16,500	35,000	148	83,000 22	0.23	A. H. Vinal.
1870	Lyman	G.	Lyman	Brick, 3 "	Grove st., E. B.	20,200	13,500 00	9,826	17,000	75,000	840	114,372 60		Bryant & Rogers.
1892	Lyceum Hall	G.	Mather	Frame, 2 "	Meeting House Hill, Dor.	21,319	10,550 67	5,118	10,600	10,000	392	20,044 93		E. M. Wheelwright.
1892	Margaret Fuller	P.	Bowditch	Brick, 2 "	Glen rd., J. P.	11,252	8,438 70	4,490	4,700	30,000	330	30,833 51	0.22	E. M. Wheelwright.
1885	Martin	G.	Martin	Brick, 3 "	Huntington Ave., Rox.	25,507	21,234 26	8,838	40,000	40,800	781	103,651 53	0.21	A. H. Vinal.
1897	Mary Hemenway	G.	Mary Hemenway	Brick, 3 "	Adams st., Rox.	30,000	0,000 00	8,015	0,000	50,000	728	122,191 31	0.19	T. M. Clark.
1872	Mather	G.	Mather	Brick, 3 "	Meeting House Hill, Dor.	125,050		6,125	43,000	36,000	616	63,438 45		Emerson & Fehner.
1897	Mayhew	G.	Wells	Brick, 3 "	Chambers st., Dor.	14,128	135,930 43	7,620	49,400	85,600	784	107,197 80	0.21	John Lyman Faxon.
1885	Mayflower	P.	Roger Clap	Frame, 1 Story	Harbor View st., Dor.				Harbor View St. Lot.		994	1,000	2,828 56	School Department.
1847	Mend-street	P.	Warren	Brick, 2 Stories	Mend st., Chan.	5,887		1,738	7,000	10,000	224			
1883	Mechanic Arts High	P.	Brick, 3 "	Reiviere st., Dor.	22,881	40,888 08	14,500	63,000	85,000	563	104,1721 29	0.18	E. M. Wheelwright.	
1886	Medford-street	P.	Prescott	Frame, 2 "	Medford st., Chan.	12,112		2,568	6,000	10,000	224	12,072 41	0.13	Geo. A. Clough.
1887	Milton	G.	Milton	Brick, 3 "	Neponset ave., Dor.	31,500	8,009 85	5,615	7,500	60,000	392	63,837 05	0.23	A. H. Vinal.
1895	Morton-street	P.	Roger Wolcott	Frame, 2 "	Morton st., Mattapan	21,115		3,042	8,300	20,400	224	20,100 48	0.18	E. M. Wheelwright.
1898	Morton-street Annex	P.	Roger Wolcott	Frame, 1 Story	Morton st., Mattapan				Morton St. Lot.		2,173	4,000	112	School Department.
1847	Mt. Pleasant-avenue	P.	Dearborn	Frame, 2 Stories	Mt. Pleasant ave., Rox.	0,519		1,030	3,800	3,700	112			
1862	Mt. Vernon-street	P.	Robert G. Shaw	Frame, 3 "	Mt. Vernon st., W. B.	34,732		2,630	5,800	6,000	168			
1874	Noble	P.	Emerson	Brick, 2 "	Princeton st., E. B.	17,500	5,047 00	4,900	7,000	40,000	448	48,508 06		Geo. Ropes, Jr.
1868	Noble Annex	P.	Emerson	Frame, 1 Story	Princeton st., E. B.				Noble Lot.		2,400	2,000	112	School Department.
1885	North Margin-street	K.	Hancock	Brick, 2 Stories	North Margin st.	1,601	825 00	761	4,200	8,000	112	2,969 77		
1868	Norcross	G.	Norcross	Brick, 4 "	D st., S. B.	120,075	5,263 86	6,022	10,600	53,000	672	73,717 20		Geo. Ropes, Jr.
1894	Oak-square	P.	Bonnett	Frame, 1 Story	Nonantum st., Bri.	20,000	0,016 48	3,005	3,600	8,000	112	20,000 00	0.10	E. M. Wheelwright.
1849	Old Agassiz	P.	Agassiz	Brick, 3 Stories	Burroughs st., J. P.			3,250		22,000	336			
1855	Old Baker-street	P.	Rob't G. Shaw	Frame, 1 Story	Baker st., W. B.	10,464		1,696	1,200	1,000	56			
	Old Brighton High			Frame, 3 Stories	Cheslant Hill ave.	51,448	trans. from Brighton	2,725	5,406	4,000				
1870	Old Dorchester High	P.	Mary Hemenway	Brick, 3 "	Centre st., Dor.	69,340		4,608	23,700	60,000	448			Geo. Ropes, Jr.
1846	Old East Boston High	P.	Lyman	Brick, 3 "	Mordian st., E. B.	18,616	5 00	6,664	27,200	70,000	336			
1855	Old Edward Everett	P.	Edward Everett	Frame, 2 "	Sumner st., Dor.			3,772		10,300	336			
1857	Old Gibson	P.	Christopher Gibson	Frame, 2 "	School st., Dor.	56,318		3,947	15,700	15,000	392			
1808	Old Gibson Annex	P.	Christopher Gibson	Frame, 2 "	School st., Dor.			2,173		2,700	112			School Department.
1831	Old Ira Allen	P.		Brick, 2 "	Leon st., Rox.	10,057		1,108	4,600	0,000	224	4,947 20	0.10	Geo. A. Clough.
1890	Old Mather	P.	Mather	Frame, 2 "	Meeting House Hill, Dor.			3,400		27,000	336			
1848	Old Parkman	P.	Brick, 3 "	Silver st., S. B.	6,300	4,150 00	2,086	3,300	12,000	336			Joseph B. Richards.	
1861	Old Roxbury High	P.	Dillaway	Brick, 4 "	Kentworth st., Rox.	6,200		3,400	6,300	50,000	448			
1842	Parkman	P.	Lawrence	Brick, 3 "	Broadway, S. B.	10,160	5,633 50	3,670	23,400	28,000	616			
1898	Paul Revere	P.	Hancock	Brick, 3 "	Prince st.	18,800	206,333 22	11,572	104,400	164,600	1,068	157,283 28	0.22	Peabody & Stearns.
1892	Phillips	G.	Phillips	Brick, 4 "	Phillips st.	11,150	31,340 00	5,620	33,600	40,400	784			Nath'l J. Bradlee.
1800	Phillips Brooks	G.	Phillips Brooks	Brick, 3 "	Quincy and Perth sts., Dor.	32,388	16,850 26	10,394	11,300	125,000	840	114,650 17	0.16	A. Warren Gould.
1867	Phillips-street	P.	Combs	Brick, 2 "	Phillips st., Rox.	20,355		4,038	14,200	35,000	448			
1890	Phineas Bates	P.	Longfellow	Frame, 2 "	Beech st., Ros.	37,600	5,600 00	3,282	1,800	25,000	224	28,876 32	0.18	G. A. Avery.
1890	Pierpont	M.		Brick, 2 "	Hudson st.	4,216		3,140	10,000	14,000	224			Gridley J. F. Bryant.
1891	Plummer	P.	Adams	Brick, 2 "	Belmont st., E. B.	35,073	24,318 37	8,604	21,000	75,000	560	78,323 09	0.20	H. H. Atwood.
1870	Polk-street	P.	Prescott	Brick, 2 "	Polk st., Chan.	12,143		4,231	5,500	20,700	336	25,712 92	0.14	Geo. A. Clough.
1861	Poplar-street	P.		Frame, 1 Story	Poplar st., Bos.	7,842		1,104	300	900	56	13,843 19		
1855	Pormort	P.	Ellot	Frame, 4 Stories	Snelllag pl.	4,373	5,614 83	2,116	4,400	10,000	336	13,640 86		Nath'l J. Bradlee.
1857	Prescott	G.	Prescott	Frame, 3 "	Elm st., Chan.	10,260		5,086	8,100	26,500	560			
1896	Prescott Annex	M.	Prescott	Frame, 1 Story	Elm st., Chan.			1,245		2,000	56			School Department.
1875	Prince	G.	Prince	Brick, 2 Stories	Newbury st.	22,000	50,080 00	10,630	51,000	126,000	672	83,630 69	0.18	Geo. A. Clough.
1880	Public Latin	P.	Brick, 3 "	Warren ave.			25,130				774			Geo. A. Clough.
1847	Quincy	G.	Quincy	Brick, 4 "	Tyler st.	12,413	9,151 83	6,450	34,000	45,000	784			
1875	Quincy-street	P.	Phillips Brooks	Brick, 2 "	Quincy st., Rox.	23,453	0,383 50	5,000	7,000	20,000	400	45,474 58	0.18	Geo. A. Clough.
1882	Quincy-street	P.	Mather	Frame, 1 Story	Quincy st., Dor.	10,413	7,000 00	2,620	5,700	3,000	112	4,971 76	0.10	Geo. A. Clough.
1869	Rice Training	G.	Rice Training	Brick, 3 Stories	Darimouth st.	27,125		10,680	74,600	65,000	784			Emerson & Fehner.
1892	Robert G. Shaw	G.	Robert G. Shaw	Brick, 2 "	Hawthorne st., W. B.	40,000	10,100 80	7,923	9,300	25,000	448	158,246 59	0.18	E. M. Wheelwright.
1886	Roger Clap	G.	Roger Clap	Brick, 3 "	Harvest st., Dor.	21,648	9,477 50	7,430	8,600	60,000	728	67,180 70	0.14	Wm. H. Bearick.
1901	Roger Wolcott	G.	Roger Wolcott	Brick, 3 "	Morton and Norfolk sts., Mattapan	39,764	13,500 00	10,883	9,900	125,000	784	137,023 29	0.18	Everett & Mead.
1891	Roxbury High	P.		Brick, 3 "	Warren st., Rox.	25,017	46,607 68	17,650	24,300	200,000	578	305,296 83	0.20	A. H. Vinal.
1874	Roxbury-street	P.	Dudley	Brick, 3 "	Roxbury and King sts., Rox.	11,147	28,600 00	6,510	11,100	30,000	448	42,940 08	0.23	Geo. A. Clough.
1831	Rutland-street	P.	Dwight	Brick, 3 "	Rutland st.	7,850		2,440	11,800	20,000	336			
1874	Samuel G. Howe	P.	Lawrence	Brick, 2 "	Fifth st., S. B.	12,494	21,835 76	6,220	8,700	30,000	448	42,898 84	0.19	Geo. A. Clough.
1884	Savin Hill	P.	Edward Everett	Frame, 2 "	Savin Hill ave., Dor.	20,040	6,018 00	2,650	7,000	3,000	224	12,753 29	0.13	A. H. Vinal.
	School-street		George Putnam	Frame, 1 Story	School st., Rox.	20,200					112			
1824	Sharp	P.	Rowdola	Brick, 3 Stories	Anderson st.	5,887		3,169	20,600	19,500	504			
1870	Sherwin	G.	Sherwin	Brick, 3 "	Madison sq., Rox.	32,640	22,428 00	10,550	29,200	65,000	896	103,900 53		Emerson & Fehner.
1809	Shurtleff	G.	Shurtleff	Brick, 3 "	Dorchester st., S. B.	40,553		9,887	32,400	75,000	784			Bryant & Rogers.
1840	Simonds	P.	Rigelow	Brick, 3 "	Broadway, S. B.			854		21,650	168			
1870	Skinner	P.	Brimmer	Brick, 3 "	Fayette st.	6,238		2,540	21,000	10,000	336	26,441 97		Nath'l J. Bradlee.
1849	Smith-street	K.	Combs	Frame, 2 "	Smith st., Rox.	6,352		1,037	1,600	4,200	112			Alden Frink.
1824	Somerset-street	P.	Phillips	Frame, 3 "	Somerset, corner Allston st.	0,300	22,000 00	2,064	75,600	14,400	336			
1891	South Boston High	P.		Brick, 3 "	Thomas Park	70,646	23,883 56	25,467	50,700	324,600	746	342,210 76	0.22	Herbert D. Hale.
1885	Stephen M. Weld	P.	Charles Sumner	Brick, 2 "	Seymour st., Ros.	34,296	3,785 64	4,795	3,400	30,000	336	47,418 62	0.22	E. M. Wheelwright.
1856	Stoughton	P.	Gilbert Stuart	Frame, 2 "	River st., Dor.	29,725		4,521	3,700	15,000	448			
1872	Tappan	P.	Chapman	Brick, 2 "	Lexington st., E. B.	11,600	5,600 00	4,035	6,000	40,000	448	48,808 06		George Ropes, Jr.
1875	Theford-avenue	P.	Roger Wolcott	Frame, 2 "	Theford ave. and Evans st., Dor.	29,870	0,000 00	6,150	5,400	17,000	448	37,060 00		Geo. A. Clough.
1889	Thomas N. Hart	G.	Thomas N. Hart	Brick, 3 "	East Fifth st., S. B.	26,264	30,000 00	9,716	10,500	150,000	728	130,269 61	0.23	A. H. Vinal.
1847	Thornton-street	P.	Dillaway	Frame, 2 "	Thornton st., Rox.	6,040			2,300	1,000	112			
1865	Tieknor	P.	John A. Andrew	Brick, 3 "	Dorchester st., S. B.	11,486	0,000 00	4,250	6,800	25,000	672			Richards & Park.
1808	Tilston	P.	Roger Wolcott	Frame, 3 "	Norfolk st., Mattapan	83,640		5,840	10,500	30,000	118			
1850	Tuckerman	P.	Lincoln	Brick, 3 "	Fourth st., S. B.	21,681		2,031	6,500	6,000	336			Gridley J. F. Bryant.
1835	Tyler-street	P.	Winthrop	Brick, 3 "	Tyler st.	3,000	6,800 00	2,310	14,500	20,000	336	15,015 60		
	Union-street			Frame, 2 "	Union st., Bri.	67,280		1,623	10,900	1,000	112			
1890	Walt	P.	Franklin	Brick, 2 "	Shawmut ave.	10,341		4,109	63,100	27,000	448			Gridley J. F. Bryant.
1898	Walnut-street	P.	Milton	Frame, 2 "	Walnut st., Neponset	22,700		3,603	4,600	10,000	392			
1852	Ware	P.	Ellot	Brick, 4 "	North Bennet st.	12,858		2,620	17,700	16,100	224			Gridley J. F. Bryant.
1897	Warren	G.	Warren	Brick, 4 "	Sumner st., Chan.	14,322		5,694	18,500	45,000	784			
1891	Warren	P.	Warren	Brick, 2 "	Bartlett st., Chan.	16,115	38,609 13	6,115	21,000					

DESCRIPTIVE SCHEDULE OF PERMANENT SCHOOL BUILDINGS.

DATE OF COMPLETION.	NAME.	DISTRICT.	DESCRIPTION.	LOCATION OF LOT.	AREA.	COST OF LOT.	AREA OF BUILDING.	ASSESSED VALUE, MAY 1, 1902.		NO. OF PUPILS.	COST OF BUILDING.	COST PER CUBIC FOOT.	ARCHITECT.	
								Land.	Building.					
1870.....	Anron Davis.....	P.	Dearborn.....	Brick, 3 Stories.....	Yeoman st., Rox.....	15,200	\$17,100 00	5,080	\$13,500	841,109	672	\$44,822 02	Charles A. Cummings.	
1893.....	Abby W. May.....	P.	Dillaway.....	Brick, 2 ".....	Thornton st., Rox.....	11,052	5,545 36	4,510	3,600	29,900	330	11,000 08	E. M. Wheelwright.	
1897.....	Aberdeen.....	P.	Frame, 1 Story.....	Chestnut Hill ave., Bri.....	25,000	13,750 00	3,500	13,700	12,000	112	19,089 76	0.17	Lewis H. Bacon.	
1900.....	Adams and Chestnut sts.....	P.	Frothingham.....	Frame, 1 ".....	Adams and Chestnut sts., Chsn.....	20,309	34,885 78	25,500	2,500	112	3,648 00		School Department.	
1891.....	Adams-street.....	P.	Gilbert Stuart.....	Frame, 2 Stories.....	Adams st., Dor.....	41,555		1,570	4,500	3,800	112			
1896.....	Adams.....	G.	Brick, 3 ".....	Belmont sq., E. B.....	21,000	0,950 00	5,027	8,400	55,000	672			Joseph R. Richards.	
1893.....	Agassiz.....	G.	Brick, 3 ".....	Brewer st., J. P.....	42,244		0,691	19,000	10,000	784	99,181 23	0.16	E. M. Wheelwright.	
1893.....	Albert Palmer.....	P.	Dearborn.....	Brick, 2 ".....	Euclid st., Rox.....	16,165		4,721	16,200	40,800	330	45,600 00	0.21	E. M. Wheelwright.
1896.....	Andrews.....	P.	Quincy.....	Brick, 3 ".....	Genesee st.....	12,978	47,600 29	4,658	24,000	67,000	504	165,604 24	0.25	E. M. Wheelwright.
1879.....	Appleton-street.....	P.	Rice Training.....	Brick, 3 ".....	Appleton st., near Dartmouth.....	18,454	28,463 26	5,660	46,100	35,000	672		Emerson & Felmer.	
1873.....	Atherton.....	P.	Christopher Gibson.....	Brick, 2 ".....	Columbia rd., Dor.....	24,761	11,289 15	5,210	11,100	50,000	448	48,022 50		Bryant & Rogers.
1896.....	Auburn.....	P.	Washington Allston.....	Frame, 2 ".....	School st., Bri.....	12,340		1,490	1,900	5,000	224			
1849.....	Austin.....	P.	Lymann.....	Brick, 3 ".....	Paris st., E. B.....	4,640	2,482	1,633	4,200	40,700	336		Gridley J. F. Bryant.	
1880.....	Bailey-street.....	P.	Henry L. Pierce.....	Frame, 2 ".....	Bailey st., Dor.....	21,838	2,729 75	2,170	3,300	0,500	224			
1880.....	Bailey-street Annex.....	P.	Henry L. Pierce.....	Frame, 2 ".....	Bailey st., Dor.....	12,600	0,250 00	1,700	1,800	4,200	224			
1899.....	Baker-street.....	P.	Bob't. G. Shaw.....	Brick, 2 ".....	Baker and Gardner sts., W. Rox.....	21,000	2,703 75	3,716	2,500	30,000	224	20,835 23	0.17	Bacon & Hill.
1894.....	Baldwin.....	P.	Phillips.....	Brick, 3 ".....	Clunton ct.....	6,139	12,278 00	2,276	18,400	11,500	336	13,488 00		
1816.....	Barlett-street.....	P.	Dillaway.....	Brick, 3 ".....	Barlett st., Rox.....	7,627		2,280	5,700	15,000	330			
1892.....	B. F. Tweed.....	P.	Bunker Hill.....	Brick, 2 ".....	Cambridge st., Chsn.....	16,737	14,216 30	4,530	16,800	25,000	336	33,991 05	0.22	E. M. Wheelwright.
1897.....	Benjamin Cushing.....	P.	Mathew.....	Brick, 2 ".....	Robinson st., Dor.....	25,032	19,000 00	5,467	5,000	40,900	448	40,435 34	0.18	A. Warren Gould.
1899.....	Benjamin Dean.....	P.	Thomas N. Hart.....	Brick, 2 ".....	H st., S. B.....	11,477		5,593	4,600	32,000	448	42,687 28	0.16	Wm. H. Besarick.
1883.....	Benjamin Pope.....	P.	Gaston.....	Brick, 2 ".....	O st., S. B.....	20,000		5,370	0,000	30,000	448	45,507 37	0.19	C. J. Bateman.
1874.....	Bennett.....	G.	Bennett.....	Brick, 3 ".....	Chestnut Hill ave., Bri.....	20,648	12,824 50	5,000	9,300	45,000	392	74,016 84		J. Foster Ober.
1886.....	Bennett Branch.....	G.	Bennett.....	Brick, 2 ".....	Dighton st., Bri.....	9,903	4,840 70	3,998	2,900	10,000	336			Geo. A. Clough.
1901.....	Bigelow.....	G.	Bigelow.....	Brick, 3 ".....	East Fourth st., S. B.....	20,704		13,505	26,300	175,000	1,064	171,892 07	0.21	C. J. Bateman.
1892.....	Blackton.....	P.	Emerson.....	Brick, 2 ".....	Leyden st., Orient Heights, E. B.....	20,160		6,864	7,500	50,000	448	56,027 11	0.20	E. M. Wheelwright.
1805.....	Bon Homme Richard.....	P.	Mathew.....	Frame, 1 Story.....	Meeting House Hill, Dor.....		Mathew Lot.			1,900	56			School Department.
1892.....	Bowditch.....	G.	Bowditch.....	Brick, 3 Stories.....	Green st., J. P.....	23,655		9,803	15,400	100,000	784	104,579 01	0.17	H. H. Atwood.
1836.....	Bowdoin.....	G.	Bowdoin.....	Brick, 3 ".....	Myrtle st.....	10,777	38,129 84	8,400	41,000	104,000	1,008	109,187 91	0.18	E. M. Wheelwright.
1895.....	Brighton High.....	G.	Brick, 3 ".....	Cambridge st., Bri.....	41,871	17,660 00	11,655	20,900	10,000	381	135,887 98	0.19	E. M. Wheelwright.	
1880.....	Brimmer.....	G.	Brimmer.....	Brick, 3 ".....	Common st.....	11,401	21,200 00	3,834	51,600	40,800	784			
1866.....	Bunker Hill.....	G.	Bunker Hill.....	Brick, 4 ".....	Baldwin st., Chsn.....	10,650		5,580	24,000	53,500	784			
1848.....	Bunker Hill.....	P.	Bunker Hill.....	Brick, 2 ".....	Bunker Hill st., Chsn.....		Bunker Hill Lot			12,500	418			
1864.....	Canterbury-street.....	P.	Charles Sumner.....	Frame, 2 ".....	Canterbury st., W. R.....	20,121		1,346	2,000	2,000	112			
1871.....	Capen.....	P.	Thomas N. Hart.....	Brick, 3 ".....	Sixth st., S. B.....	12,354	0,145 31	3,361	0,200	20,000	336	34,716 35		Cummings & Sears.
1901.....	Chapman.....	G.	Chapman.....	Brick, 3 ".....	Eulaw st., E. B.....	20,150		12,131	10,800	130,000	896	121,830 33	0.17	Greenleaf & Cobb.
1870.....	Charlestown High.....	P.	Brick, 3 ".....	Monument sq., Chsn.....	19,635		5,549	20,300	50,000	290				
1897.....	Charles C. Perkins.....	P.	Prince.....	Brick, 2 ".....	St. Bololph st., Ros.....	40,000	36,386 45	7,730	48,500	48,000	418	76,500 00	0.23	H. H. Atwood.
1897.....	Charles Sumner.....	G.	Charles Sumner.....	Brick, 3 ".....	Ashland st., Ros.....	39,000	6,000 00	6,142	3,000	30,000	560	50,252 35	0.11	C. A. Clough.
1897.....	Chaucy-place.....	P.	Frothingham.....	Frame, 1 Story.....	Chaucy pl., Chsn.....	7,410		610	3,700	1,000	56			
1897.....	Chestnut-avenue.....	P.	Bowditch.....	Frame, 2 Stories.....	Chestnut ave., J. P.....	13,733		1,403	5,600	2,000	112			
1897.....	Choate Burnham.....	P.	Lincoln.....	Brick, 2 ".....	East Third st., S. B.....	17,130	6,277 40	5,896	6,900	35,000	448	60,887 10	0.20	E. M. Wheelwright.
1897.....	Christopher Gibson.....	G.	Christopher Gibson.....	Brick, 2 ".....	Bowdoin ave., Dor.....	39,620		14,208	9,900	90,000	672	111,029 53	0.14	E. M. Wheelwright.
1897.....	Cinch.....	P.	Shurleff.....	Brick, 3 ".....	F st., S. B.....	13,492	4,599 00	2,070	9,600	25,000	336	33,628 59		Bryant & Rogers.
1897.....	Coinins.....	G.	Coinins.....	Brick, 4 ".....	Tremont st., Rox.....	22,169		4,893	33,300	10,000	728			Richards & Park.
1897.....	Common-street.....	P.	Harvard.....	Brick, 3 ".....	Common st., Chsn.....	7,001		1,879	10,600	8,000	336			
1897.....	Cook.....	P.	Franklin.....	Brick, 3 ".....	Groton st.....	10,170	10,412 50	1,792	17,800	15,000	336			
1897.....	Cottage-place.....	K.	Coinins.....	Frame, 2 ".....	Cottage pl., Rox.....	7,094		2,098	14,200	2,600	224			
1897.....	Cudworth.....	P.	Lymann.....	Brick, 2 ".....	Gove st., E. R.....	25,000	20,714 14	8,360	25,000	80,000	616	71,185 31	0.17	E. M. Wheelwright.
1897.....	Cushman.....	P.	Hancock.....	Brick, 4 ".....	Parmenter st.....		Hancock Lot.			92,000	896	57,721 27		Gridley J. F. Bryant.
1897.....	Cyrus Alger.....	P.	Norcross.....	Brick, 2 ".....	Seventh st., S. B.....	10,590		5,990	10,000	12,000	418	48,872 98	0.20	Geo. A. Clough.
1897.....	Dearborn.....	G.	Dearborn.....	Brick, 4 ".....	Dearborn pl., Rox.....	30,026		7,181	22,200	24,800	784			
1897.....	Dillaway.....	G.	Dillaway.....	Brick, 3 ".....	Kennelworth st., Rox.....	22,824	34,238 10	8,030	22,600	60,000	672	78,074 16	0.13	Geo. A. Clough.
1897.....	Dorchester-avenue.....	P.	Mary Hemenway.....	Frame, 2 ".....	Dorchester ave., Dor.....	34,460		2,650	12,000	2,500	224			
1897.....	Dorchester High.....	G.	Brick, 3 ".....	Talbot ave., Dor.....	50,870	36,000 00	25,857	30,800	150,000	840	309,026 43	0.10	Hartwell, Richardson & Driver.	
1897.....	Drake.....	P.	Norcross.....	Brick, 3 ".....	C st., S. R.....	10,260	8,000 00	2,682	12,800	20,000	336	33,872 04		Bryant & Rogers.
1897.....	Dudley.....	G.	Dudley.....	Brick, 3 ".....	Dudley and Putnam sts., Rox.....	20,339	8,000 00	12,070	32,901	75,000	784	132,480 05		L. Welshela.
1897.....	Dwight.....	G.	Dwight.....	Brick, 4 ".....	West Springfield st.....	19,125	22,025 00	5,531	28,700	60,000	784	40,338 35		
1897.....	East Boston High.....	G.	Brick, 3 ".....	Marion st.....	27,500	63,180 27	21,477	20,600	225,000	552	270,040 92	0.23	John Lyman Faxon.	
1897.....	Edward Everett.....	G.	Edward Everett.....	Brick, 3 ".....	Sumner st., Dor.....	33,830	Trans. from Bot.	6,080	8,600	29,700	560	42,584 98	0.12	Geo. A. Clough.
1897.....	Elliot.....	G.	Elliot.....	Brick, 4 ".....	North Bennett st.....	11,077		5,673	33,100	45,000	784			Gridley J. F. Bryant.
1897.....	Emerson.....	P.	Wells.....	Brick, 3 ".....	Poplar st.....	5,924	7,000 00	2,155	14,800	15,200	336			
1897.....	Emerson.....	G.	Emerson.....	Brick, 3 ".....	Prescott st., E. B.....	39,032	8,000 00	8,610	20,000	90,000	896	101,383 76		
1897.....	English High.....	G.	Brick, 3 ".....	Montgomery st.....	85,560	228,000 00	25,170	256,700	325,000	878	841,127 41			Geo. A. Clough.
1897.....	Everett.....	G.	Everett.....	Brick, 4 ".....	West Northampton st.....	32,409		5,645	48,600	60,000	784	53,000 00		
1897.....	Everett.....	P.	Washington Allston.....	Frame, 2 ".....	Brentwood st., Bri.....	44,235		1,387	8,000	2,000	112			Gridley J. F. Bryant.
1897.....	Florence-street.....	P.	Charles Sumner.....	Frame, 2 ".....	Florence st., Ros.....	25,630		3,658	3,000	5,000	336			
1897.....	Franklin.....	G.	Franklin.....	Brick, 4 ".....	Ringgold st.....	10,439		5,496	41,100	50,000	784	40,453 67		Joseph R. Richards.
1897.....	Francis Parkman.....	P.	Agassiz.....	Brick, 2 ".....	Walk Hill st., Forest Hills.....	39,000	9,000 00	4,421	7,500	20,000	224	34,724 39	0.18	Perkins & Betton.
1897.....	Frederic A. Whitney.....	P.	Washington Allston.....	Brick, 2 ".....	Webster ave., Bri.....	10,701		7,058	4,300	60,000	448	47,880 49	0.18	Whitman & Hood.
1897.....	Freeman.....	P.	Elliot.....	Brick, 3 ".....	Churist st.....	5,217	12,089 07	2,350	13,100	10,900	336	28,127 62		Bryant & Rogers.
1897.....	Frothingham.....	G.	Frothingham.....	Brick, 3 ".....	Prospect st., Chsn.....	22,079	41,150 00	9,383	21,800	65,000	896	78,066 81	0.17	Geo. A. Clough.
1897.....	Frothingham Annex.....	P.	Frothingham.....	Frame 1 Story.....	Prospect st., Chsn.....		Frothingham Lot.			5,000	112			School Department.
1897.....	Gaston.....	G.	Gaston.....	Brick, 3 Stories.....	East Fifth st., S. B.....	35,358	24,763 70	10,940	19,400	25,000	784	104,104 67		Geo. A. Clough.
1897.....	George Putnam.....	G.	George Putnam.....	Brick, 3 ".....	Columbus ave., Rox.....	31,784	13,102 87	7,229	20,600	29,600	500	64,749 15	0.19	Geo. A. Clough.
1897.....	George-street.....	P.	Hugh O'Brien.....	Brick, 3 ".....	George st., Rox.....	18,894		3,045	11,400	21,600	336			
1897.....	Gilbert Stuart.....	G.	Gilbert Stuart.....	Brick, 3 ".....	Richmond st., Dor.....	30,428	13,048 00	0,306	9,300	100,000	784	114,059 58	0.19	E. M. Wheelwright.
1897.....	Girls' High.....	G.	Brick, 3 ".....	West Newton st.....	32,820	68,212 31	18,530	65,600	200,000	925	234,563 39			
1897.....	Glenway.....	P.	Christopher Gibson.....	Frame, 1 Story.....	Glenway st., Dor.....	38,897		2,184	10,400	2,800	112	3,163 98		Geo. A. Clough.
1897.....	Grand.....	P.	Phillips.....	Brick, 2 Stories.....	Phillips st.....	3,741	4,677 50	2,021	8,400	9,100	224			
1897.....	Harbor View-street.....	P.	Roger Clap.....	Frame, 2 ".....	Harbor View st., Dor.....	27,808	20,000 00	2,825	11,100	10,000	224	18,032 64	0.12	C. J. Bateman.
1897.....	Harris.....	P.	Mary Hemenway.....	Frame, 3 ".....	Adams st., Dor.....	37,150		5,805	9,300	20,300	504			
1897.....	Hancock.....	G.	Hancock.....	Brick, 4 ".....	Parmenter st.....	31,988		6,129	50,000	43,100	784			Charles Routh.
1897.....	Harvard.....	G.</												

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walls. Trap-doors leading into receptacles below the level of the roof, containing steam pipes, are provided for melting the snow which may lodge upon the roof. In the other type the whole upper story of the building is left as one large room opening into the roof, divided by a partition to separate the boys' part from that used by the girls. The windows are protected inside by heavy wire screens.

In New York no space is set apart especially for assembly halls. An arrangement of sliding partitions has been adopted by which several class-rooms may be thrown into one. Under this plan the students of one floor at a time can be assembled. This is done to economize space and to avoid the expense of building an additional story for an assembly hall.

The class-rooms are not as large as in most other cities, ranging from twenty-five feet square to twenty-five by thirty feet. No particular attention is paid to securing the light from one side, and in most rooms the windows are grouped.

In New York an ingenious type of stairs has been adopted, known as the "Twin Stairs," on the X plan, which provides for two sets of stairs in the space usually occupied by one; one part is used by the boys and one part by the girls. All buildings are fireproof throughout. The stairs are built with iron stringers and risers, with North River stone treads and landings. As before stated, the use of the sliding partition is general. It is a large partition, running on iron trucks suspended from the ceiling, used to separate one class-room from another, and in many instances to separate class-rooms from the corridors. Rock asphalt floors are used in corridors and in play-rooms. As no separate rooms are provided for clothing, the clothing is usually hung in the corridors, enclosed within wire screens. All walls have hard finish, and are left white, and most of the buildings are finished in soft pine, shellacked.

In the sanitarious system is almost exclusively adopted. There are no doors to the toilet-closets and the partitions between them run from twelve inches above the floor about half way to the ceiling. Slate urinals are in general use, but in a few schools individual porcelain urinals have been installed. There are no hospital rooms, but there are separate rooms for the teachers.

The ventilation is by the Sturtevant Blower System, with the intakes on the third floor. Blowers are used only when the steam heat is on. Speaking tubes are used rather than telephones, and these are restricted practically to those running from the principal's room to the corridors on each floor. Manual training, cooking schools and gymnasium rooms are on the top floors.

Slate blackboards are used exclusively. We saw no movable or portable boards. There are no platforms for the teachers, but in many of the rooms a high chair is provided for the teacher.

All furniture is of the combined type, that is, with a seat and desk on the same irons.

Philadelphia. — In Philadelphia we called at the office of the Board of Education and met the Superintendent of Schools, Dr. Brooks (in Philadelphia there is no school architect), and upon his recommendation visited the Girls' Grammar School, the Boys' High School, a mixed school, and a school on Fitzwater street.

Most of the buildings are built with iron stairways enclosed in brick walls. When fire escapes are used they are located inside the building, being really iron stairways with stone treads enclosed in brick walls, having two types of entrances, one from the building, the other from the balconies running along the outside of the building. The iron "twin" staircase is used here in the buildings occupied by both girls and boys. The finish generally employed is yellow or North Carolina pine. Stamped-steel ceilings are used in almost every instance; and tiling is used for dados in most of the buildings, and in many cases in the school-rooms. This is not found satisfactory. Rubber tiling is used in some corridors in the high school buildings, and this also is unsatisfactory. The heating and ventilating is done by a blower system, with the in-takes close to the ground.

Sliding partitions are used exclusively in many schools, and in some, where the corridors are separated from the class-rooms by permanent walls, movable partitions are used between the several rooms, in order to enable all the rooms on one side, so connected, to be thrown into one. This is not approved by the teachers on account of the noise.

One of the buildings examined was square in plan, with a central opening in the hallway, running clear to the roof. There are no playgrounds connected with this building, the whole upper floor being used for this purpose. The latrine system is used in many of the buildings. No particular attention is paid to lighting school-rooms from one side. Many of the schools have individual electric lighting plants, but we could not find that this was an economical system to adopt. Teachers' rooms and teachers' dining-rooms are adopted. Maple floors are used in school-rooms. Many of the schools have sand-gardens in the basements for the use of the smaller pupils. These are not, however, highly endorsed by the persons in charge of the buildings, and in one school that we visited the sand had been removed. There are no platforms in the school-rooms. Ante-rooms are provided for the children's clothing, similar to those in Boston, but the rooms are in no case plastered, the brickwork being painted.

Washington. — In Washington we called upon Mr. A. T. Stewart, Superintendent of Schools, and had a lengthy interview with him in regard to the situation in Washington. The problem there is a peculiar one. There is no special fund for school purposes. All the property in the District is taxed, and then Congress adds to the amount so raised an equal sum, and this is spent for District purposes under the direction of the Commissioners. There is for this reason much less money expended for school purposes than there otherwise would be. The great problem

then has been to build cheaply, and a large number of eight-room buildings have been constructed. Two-thirds of the school children are white and one-third black, and separate schools are used for the two classes.

We visited the High School in the Georgetown District, the Grant School in the centre of the city, and the Bruce and Hubbard schools in the newly-settled section on Columbia Heights. The High School is an imposing-looking building on elevated land, costing about \$100,000.

No attention is paid to lighting class-rooms from one side. Stamped-steel ceilings are used almost exclusively; but it was claimed that the noise made on the floor above was very objectionable in the room below. The buildings are not fireproof. The iron stairways, enclosed in brick walls, have slate treads, and no fire escapes are used. The floors are made of rift pine, treated with an anti-dust oil, which is highly endorsed by all janitors with whom we talked. The sanitaries are fitted up with individual closets, but of a less expensive pattern than those used in Boston. Ground glass is used as a writing surface in the sliding blackboards for special work in certain rooms. The only shower baths seen, so far, were connected with the gymnasium in the High School buildings. There are no ante-rooms, clothing being kept in lockers in the corridors for the girls and in the basement for the boys. The buildings have flat roofs. There are no platforms in the rooms, and the Boston style of furniture is used. There is a teachers' room, and an arrangement is provided in the basement for lunches for the scholars.

In the schools for the secondary grades the same style of stairways are used, the most satisfactory being built with thirteen-inch treads and six-inch risers. The walls are plastered, including the blackboards. Landings with mosaic floors are used in some buildings. The ante-rooms are on the Boston plan. An ingenious style of drinking fountains is used, similar to some of those found in our parks, where a person drinks from a jet of water, no cups being necessary. These buildings are covered by flat, tinned roofs which, however, do not work satisfactorily. They also have teachers' rooms.

Both the latrine and individual closets are used. In these, in some cases, the partitions are of iron. The latrine system in some cases was used for both closets and urinals. Over the closets a sheet-iron ventilating shaft is run through the toilet-room with an intake over each compartment. This is not connected with the blower system, however. Gas is used to create a draught in these shafts and also in the ventilating flue over the urinals. The ventilating fans are run by a gas engine, reported to work satisfactorily. No provision is made for avoiding cross-lights in the rooms. Anti-dust oil is applied to the floors, as in High Schools. Rooms in general are thirty feet by thirty-six feet, there are no assembly halls, and the rooms are separated by sliding partitions. The Boston style of furniture is used, and no platforms for the teachers. Some of the eight-room buildings

are heated by furnaces, and in others they are heated by a combined direct-indirect steam-heating system. Some yards have a granolithic pavement and some are not paved at all. Several schools have no yards. The janitors in the Washington schools make all ordinary repairs, and during the summer months are obliged to be in attendance at the schoolhouses and do all necessary work to get the buildings in proper condition for opening in the fall.

Chicago.—In Chicago the Commissioners called upon Mr. Edwin G. Cooley, Superintendent of Schools, who arranged to have one of his draughtsmen in the School Architect's Department take us to schools which he considered typical. We visited and closely examined two grammar and one high school.

Under the Chicago building laws schoolhouses may be constructed with fireproof corridors and iron stairways enclosed in brick walls, and the rest of the interior of the building of ordinary wooden construction. Cement floors are used in corridors and upon the stair-landings, with wooden treads on the stairs. Cement floors were pronounced satisfactory and inexpensive. It is claimed that they are not only more durable, but are practically noiseless. All the rooms are lighted from the left side, and generally all windows are grouped.

Each class-room in the grammar schools was provided with an anteroom, opening from the class-room without a door, and with no opening from the anteroom to the corridors. The reason for putting no door at the opening between the class-room and the anteroom is, that in the system of ventilating provided, the inlet is in the class-room and the outlet in the ante-room, which is designed to make a continuous circulation.

The floors in the school-rooms are of maple, usually in about four foot lengths. This is done to save expense, it being claimed that the floors, after a few months wear, look as well as those of better quality of lumber, and as the short lengths are of little use to the mill, they can be purchased at a very low price. No flooring of first quality was used except in the master's room.

The School Board does nothing towards tinting the walls in the grammar schools. In what was called the model schoolhouse, the walls were tinted, through a private enterprise, on a well-developed scheme. Buff and yellow tints were used on rooms not having direct sunlight, and green on rooms exposed to the sun. In the new buildings prepared burlap is used as a dado or wainscoting. It is treated, after being laid, with two coats of lead and oil paint, and the results are very satisfactory. It is easily kept clean, presents an artistic appearance, and prevents injury to the plaster underneath, and was highly approved by masters and janitors.

None of the grammar schools have a room especially set apart for an assembly hall; in some, however, rolling partitions are adopted, but not with entirely satisfactory results. All the corridors are made very wide, a standard width of eighteen to twenty feet being adopted. These are used for light gymnastics

and assembly purposes. The roofs are generally flat, treated with tar concrete, which is pronounced by the School Architect Department to be very satisfactory. Buildings are all finished in yellow pine in the natural wood. Large doors with panels of clear plate glass lead to class-rooms.

The sanitary and heating plants are in every case placed outside the main buildings. The latrine system, of ironwork, painted in white enamel, is used, but it is below the standard required in Boston. The ventilation is arranged upon what is known as the Waters System, and is claimed to be very satisfactory. Mr. Thomas J. Waters, who claims to have developed this system, is the chief engineer of the Chicago Board of Education, and this system (whether Mr. Waters' or that of some one else) appears to be the basis of most of the more highly developed systems of heating and ventilation.

The repair system and department workshop is very fully developed. A large permanent force of skilled workmen is employed. A large building is fitted up with wood-working and other machinery for the use of the department, and all repairs are made by men regularly in the employ of the Board, and all furniture, except school furniture, is built by them.

They have one architect who designs all their buildings and superintends all their repairs. The present incumbent is an architect practising his profession in the city, and is under contract to devote but three hours a day of his time to the school work. For this he receives a salary of six thousand dollars.

In Chicago, as in some other places, the Board is obliged under the existing law, to award separate contracts for each kind of work done, so that in building some schoolhouses eighteen or twenty different contracts are awarded. The practical result of this system of dividing the work up into a large number of small contracts seems to be that work is probably done for ten per cent. less than it would be if let out in one or perhaps two contracts. The admitted disadvantages of the system are that there are so many sets of mechanics that they are constantly interfering with each other and claiming allowances for delays caused by other contractors, so that it is absolutely impossible to get a building finished within the time limit, or to enforce any penalty for a breach of the time limit clause. It was also freely stated that buildings erected under this system are not nearly so well constructed as where the entire responsibility rests upon one or two contractors. It was the opinion in Chicago, at least, that the early demands for repairs upon buildings erected in this way would more than offset the saving made in the original cost.

A simple but useful plan of foot-warmers is used in the play-rooms. These are made by running a steam pipe under a low seat built against the wall and protected by a wire grating.

St. Louis.—We were advised to visit St. Louis, it being reported that special attention had been paid recently to schoolhouse construction, and that very satisfactory results were obtained.

We had an extended interview with Mr. William B. Ittner, School Architect and Superintendent of Repairs, a very competent man, who gives all his time to the work of the Board of Education; and upon the recommendation of the department visited the Wyman, Eugene Field, and John Marshall schools, (all grammar buildings), and also examined a portable building. The three grammar schools were of the latest construction and said to be typical. They are fireproof throughout, except the roofs, which are of mill construction.

The corridors are very wide and are used for gymnastic and assembly purposes. No assembly halls are provided, although some principals with whom we talked thought it would be of great assistance to them if they could have assembly halls. Maple floors are used in halls and school-rooms. A marble base-board and a narrow marble border are used in all corridors. The stairs are of iron, the treads being made of concrete with a wearing surface of asphalt held in place by a lip carried up from the risers. The heating and ventilation is a modification or development of the "Waters System," although it is spoken of here as the "Buffalo Blower System."

All interior finish is oak. Rooms are in general lighted from the left. Anterooms are provided as on the Chicago plan. In this city a system of swing doors to all school-rooms has been adopted. These doors are built single with a large plate glass panel in the upper part, and are covered with dark green leather. All the principals talked with were greatly pleased with these doors, which were claimed to be practically noiseless. The walls are painted in oil. A definite color scheme is adopted, and simple ornamentation used. In the sanitariums the Mott fixtures are used in the teachers' room and a modified system of latrines for the children. All buildings are built of brick, laid in cement mortar, with a very wide joint.

Slate is used for blackboards. A space of about ten inches high is left running the entire length above the boards with a grooved moulding at the top and bottom to allow the placing of cards and other educational and decorative features, something after the plan of advertisements in our street cars. These were pronounced to be very useful. In all class-rooms a teachers' wardrobe and bookcase were built into the wall.

As in Chicago, a Repair and Construction Department is maintained, and portable schoolhouses are built by them, so far as carpenter work is concerned, for about nine hundred dollars. We examined these schools with much interest, as these are supposed to be the original schools from which our own system has been adopted. It is only necessary to say that, owing to the climatic conditions in that city, it is possible to build them much lighter than we can in Boston. The inside finish is much cheaper. We were greatly interested to find that a concern which offered under a bid to supply our portable buildings with furnaces at an expense of one hundred and fifty-five dollars each

have provided the same identical thing for the Board of Education in St. Louis for the sum of ninety dollars apiece, and were well satisfied to sell them at that price.

Toledo. — At Toledo we called at the office of the Board of Education and met Mr. William Burge, Superintendent of Buildings, and under his guidance visited the Glenwood School, in process of erection, also the Central High and three grammar schools (one new and two older). The buildings are not fire-proof.

Special attention is paid to left hand lighting, the exterior wall being left absolutely blank, which is necessary to carry out this plan.

Slate blackboards are used on three sides of the rooms. Floors are of maple, stairs of oak, and finish usually of Georgia pine. Anterooms are entered from school-rooms. No assembly halls are provided except in high schools. All buildings have very wide corridors, which are used for gymnastic and assembly purposes. The stairs are wide enough for the children to march down in a column of fours, and this plan of marching is used constantly. School buildings are heated exclusively by hot air furnaces, although blowers are used in some cases to force up the hot air. An automatic system is used for registering in the janitor's rooms the temperature of the school-rooms. The janitor is thus enabled to regulate the temperature in each school-room directly from the furnaces. A modified latrine system is used in all sanitariums. Teachers' rooms are provided, as they are in almost all places visited.

Cleveland. — In Cleveland we met Mr. Frank S. Barnum, the superintendent and architect of school buildings. In this city they are building fireproof schoolhouses. They have studied the matter of school-room lighting and have come to the conclusion that exclusive left-hand lighting is not desirable. They have adopted slate blackboards in all the schools.

We visited the East High School, a large building, extremely plain as to appointments, with rock asphalt floors in the halls and landings and rock asphalt treads on the stairs. The buildings are wainscoted with salt-glazed brick. This is of a dark brownish color, but has the advantage of being comparatively inexpensive and not showing marks. In the Wade Park School we noticed that they have adopted maple for the flooring. In Cleveland the heating apparatus is within the building. A fan system of heating is used and also an exhaust fan system for ventilation.

In substantially all their buildings they have put the stairways in projections on either end of the building, so that the exits are in stairways enclosed in brick walls and with a single opening into the building on each floor. White pine is used for the finish. The latrine system is used. The playgrounds are not paved. In this city they have adopted a portable schoolhouse on Boston lines, but with much lighter framing. They were costing at the time we were there about \$1,300 for carpenter work.

Buffalo. — In Buffalo we were unable to see the Superintendent of Schools, but met Mr. Upton, the Superintendent of Manual Training, and with him visited the Grammar School No. 43, one of their latest and typical school buildings. It is built of red brick without trimmings, of fireproof construction throughout, iron stairs with slate treads, and has stamped steel ceilings. The floors are of maple and the standing finish of pine painted. The corridors and rooms are wainscoted with brick. The lighting is all from the left. The clothing is kept in ventilated cases, built in the corridors, having rolling steel doors. The sanitariums are located on each floor, individual closets being used. The fan system of heating and ventilating has been adopted.

Rochester. — In Rochester we visited the Mechanics' Institute, and examined with great care the Eastman building, a gift from Mr. Eastman of camera fame, and particularly worthy of study as being a building erected for a specific purpose and without any lack of money. The material used in the construction is red brick for walls and partitions, with steel beams and trusses for floors and roof. The space between the beams is filled with hollow tile covered with cement, which has been given a fine finish for floors in halls and laboratories, and has been covered with a hardwood lining throughout the remainder of the building. Doors, casings, and other necessary wood-work are of Georgia pine or quartered oak. There is no plaster on any of the walls, and they are painted in lead and oil.

Externally, the building is absolutely devoid of any architectural feature whatsoever, the walls being absolutely plain and unbroken save for the windows and window sills, which project very slightly, and the cornice, which is simply an extension of the wall, and which projects perhaps two or three inches over the main face of the wall, and has a plain stone capping.

A fan system of heating and ventilating has been adopted, and is claimed to be so perfect that the entire quantity of air in the building can be changed every ten minutes. A novel feature in connection with the heating system was the "intake room," through which all the supply of fresh air comes from out of doors. One side of this room, through which all the air must pass before going into the heating system, is occupied by a screen made of gray coke, some eight or ten inches thick, held in place by copper wire nettings, with a perforated water-pipe extending along the top of this screen, so that when the system is in operation a constant stream of water is kept running down over the coke screen. This serves not only to clear the air of dust and other impurities, but has a very marked effect in lowering the temperature of the air in warm weather.

APPENDIX VIII.

REPORT ON SCHOOL DESKS AND CHAIRS.

Up to near the middle of the last century school furniture had been improved only along lines of convenience and mechanical perfection with little regard to hygienic needs. Since then there has been lagging progress, but even to-day much of the furniture in use is, hygienically, little in advance of the primitive fittings of the "little red school-house."

Reform in this country, save for rough adjustment of heights, dates back practically to the publication of an article by Barnard in 1842,¹ abroad, Fahrner of Zürich² twenty years later was the first to begin really effective study of the problem.

Two years later v. Meyer of Zürich worked out the anatomical and physiological problems involved.³ From him date the usual classifications of sitting positions and the problem of back support.

Cohn, writing from the early sixties onward, contributed to the discussion the eye specialist's point of view.

Staffel in 1884 again studied the question, as also Schenk in 1886, from the orthopedist's standpoint, and Lorenz followed in 1888 with his "Die heutige Schulbankfrage." These men, as also Schulthess in a more recent article, concerned themselves largely with the problem of back-rests as affecting the development of lateral curvature.

Meanwhile, commissions were appointed to study the problems involved. As early as 1873 the Ministry of Culture and Instruction in Saxony published a most intelligent set of regulations⁴ for school furniture. The Frankfort commission's report in 1885, those of the Prague and Viennese commissions in the late eighties all contained scale tables, and the Viennese committee formulated (as conditions for a prize contest) a set of specifications which practically holds good to-day.

During all this time of investigation models by dozens were being devised,⁵ most of them ingenious rather than scientific, some theoretically sound but not practicable, very few representing intelligent advance.

The actual questions to be considered fall naturally into three groups:

- (a.) The urgency of attending to proper fitting.
- (b.) The problems in physiological mechanics to be solved.
- (c.) The mechanical construction of apparatus to meet the requirements.

¹ His book on "School Architecture" was not published till 1848.

² Das Kind u. der Schultisch. 1865.

³ H. v. Meyer. Die Mechanik des Sitzens. 1867. Virch. Arch. f. path. Anat. Bd. XXXV.

⁴ Verordnung der Anlage u. inn. Einrichtung der Schulgebäude, etc., Minist. des Cultus u. off. Unterrichts, Dresden, 1873.

⁵ In my notes of those which attained more than a trial and were frequently mentioned in the literature, I find 32; the total has been estimated at 150—probably it is even higher.

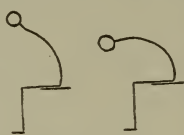
(a.) With the first part of the subject we need concern ourselves but little, for the evils of bad furniture are now fully admitted. It is well established that defective furniture is a potent factor in causing the round shoulders, spinal curvatures and short-sighted eyes that are still so commonly to be found developing in school children.

Illustrations of the way in which ill-fitting seats and desks favor distorted attitudes may be found in the plates of Dr. Scudder's article—School Document No. 9—in the sketches from Dr. Burnham's photographs published by Bobrick in 1892, and in all the books on school hygiene. Some of the commoner results in attitude are shown in the sketches which accompany this report.

(b.) The problems in physiological mechanics.

In sitting, the weight is borne more or less nearly balanced on the seat-bones. If we lean forward the muscles of the back and buttocks must take such strain as is not borne by the arms. If we lean backward the back of the seat supports a part of the weight; leaning backward with the belly muscles supporting the trunk is possible only for a very short time without some support to the back.

In the forward position the spine in profile shows almost inevitably an increased convexity; if the forward bending is still more, the convexity intends to droop; the weight is partly supported by the arms, and a twist of the spine is lower the desk the more nearly inevitable. The distance of the desk from the seat acts in nearly the same way as lowering the desk.



(see also figure 5); but is toward this:

The most usual position of slight leaning back; here is needed low down to pre- at the loins; in practice a needed for comfortable sitting.



In the backward position the back takes curves varying according to its points of support, as here shown. In the balanced sitting position the curves of the back should be like this:



the tendency under fatigue

assumed in reading is one it is obvious that a support serve the normal hollowing support higher up is also

In writing the tendency is to assume the forward position; if there is much forward leaning no back-rest has any influence on the curves. If a nearly balanced position is assumed for writing the upper back-rest is not needed; the lower still preserves the arch of the lower back (see figure 7). The preservation of this curve in sitting is important, for it is the arching of the back that not only tends to round the shoulders, but is also an important factor in favoring spinal curvatures.

Up to this point, then, we see the need of a chair-back that shall support the back low down, whether the pupil sits upright or leans back. This support should be somewhere between the hip bone (pelvis) and the "small of the back." Higher up, but

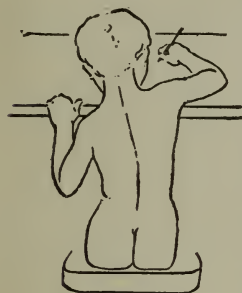


Figure 1. Attitude with too high a desk.

not above the lower end of the shoulder blades, there should be another support, further back than corresponds to the balanced sitting position, but not very far back of this point. Some of the earlier writers¹ advocate a low support only, but the upper support is needed. Others² recommend a sharp backward tilt of the whole seat, including the back support. This is all right in regard to back support, but it is not convenient without greater slope of the desk than is practicable. The regulations for Saxony call for a slope of one in twelve back from the vertical line; the more modern expression of this is a low support $\frac{1}{2}$ to 1 inch in front of the base of the seat-back, a higher support about $1\frac{1}{2}$ inches behind, that is, 2 to $2\frac{1}{2}$ inches behind the lower one. It is advisable to have both—at all events the lower one—adjustable for height. To minimize twisting sideways in the seat the upper, and preferably also the lower, support should be somewhat concave from side to side.

As to the seat proper, there should be depth enough to furnish a bearing to the buttocks and to a large part of the under surface of the thighs³—this in the interest of comfort and of stability. The measurement usually agreed on is two-thirds the length of the thigh; too great depth is no disadvantage unless the front edge strikes the back of the knee.

The width of the seat should be at least that of the buttocks—not much more than this, however; too much width tends to "slouchy" attitudes.

The seat should slope slightly down and back—enough to furnish some security against the scholar's sliding forward when he leans back—not enough to cause an appreciable tilting of the



Figure 2. Attitude with too high a desk.

¹ Especially v. Meyer.

² Lorenz, Schulthess and others.

³ Schenk seems to be alone in advocating a seat of less depth.

pelvis if he sits sidewise in the seat. The usually agreed-on dip is about $\frac{3}{8}$ inch — not over twice this at most.

Some concaving of the seat is usual and is comfortable, though not mechanically essential.

The height of the seat from the floor should be such that, with the knees at a right angle, the whole foot may rest on the floor; any error had better be in the direction of a slightly lower seat; pressure on nerves and vessels behind the knee may result from a seat only a little too high.

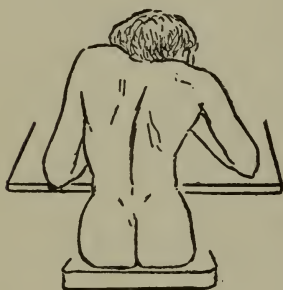


Figure 3. Forward bending and twist from too low or too distant a desk surface.

The desk should be of such height¹ that the lower edge (in writing) lets the forearm rest on it naturally with the elbow at or near the side. This is the position agreed on as best in itself, and is consistent with modern vertical writing.

As to the slope of the desk, the theoretically desirable slope for reading is at least 30°. This, however, is not practicable for writing, and is at best inconveniently steep to put things on, so a compromise is the usual solution. The Vienna Commission says 15°, Eulenberg and Bach say 17°, others 1 in 6 or 1 in 8, all practically equivalent.

With this slope and the desk-height as above, we have about the proper distance of the eyes from their work, 12 inches to 35 cm. (14 inches).

The width of the desk is immaterial so long as it is conveniently wide; 22 to 24 inches is usual.

The depth is not of prime importance; there should be room enough to work, and the ink-well should not be unattainable.

As to the distance from the seat to the desk, the vertical writing system calls for such a space as shall let the hand come down nearly to the edge of the desk without the elbow striking the back support, namely, a distance from seat-back to desk-edge equal to the length from wrist to elbow.

This brings the desk-edge pretty close to the body in comfortable writing position.

This arrangement makes it possible to write freely and easily with the body pretty evenly balanced, or even leaning backward



Figure 4. Forward bending from too low a desk.

¹ The height of the near desk-edge above the seat is technically called the "difference."

slightly. With the desk-edge so close the pupil is rather cramped and in poor position for reading. The compromise usually made is to have the desk a few inches further forward; this is well for reading, but for writing this requires a forward sitting position (see figure 6), which is undesirable because (a) the back loses its support, (b) the supporting of weight on the arm tends to rotated postures, twists of the spine, (c) the posture tends to round shoulders, (d) the posture tends to bring the eyes too close.

For these reasons it is desirable to be able to have an adjustment to give a writing and a reading distance of desk from chair to suit the occasion.

This adjustment should have a range of at least four or five inches. In the avoidance of vicious attitudes this adjustment is of the utmost importance, and a surprising amount has been written in regard to positive, negative and nil "distance."¹ With the "distance" *adjustable* we have plenty of room to move about, an easy supported position for reading, and, for writing, a good position with a minimum tendency to lean forward or twist, and with a support to the lower back that works against distortion. With no *single* position can all these things be attained.

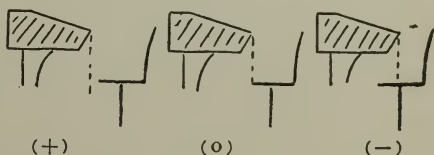
(c.) Mechanical devices.

The foregoing specifications as to what a desk should do are to-day pretty well agreed on in theory. To fulfil one or many of them a vast number of desks, desk chairs, etc., have been devised, approved, and warmly advocated. Most of these are lost—others fantastic or useless—few worth noting as a record of more or less successful progress.

It must be remembered that much of the work done has been German, and that while we have worked with iron construction and individual desks, the German started his devices working up from wooden school benches. The wooden bench in one or another form is still strong in Germany, and much work has been wasted in an attempt to accommodate individuals of varying size by adjusting *parts* of a two-seated desk. Again, the benches make standing-up a problem, and much ingenuity has been spent in allowing for the possibility of standing and for an easy entrance and exit.

Parow, Cohn, Erismann and others devised folding desk-tops for this purpose, and Sandberg a seat that snaps out of the way like a theatre chair, while the much quoted "Columbus" desk of Ramminger and Stetter has an ingenious automatic seat that folds up, roof fashion, in a gable. In Beyer's model the seat slides back, in v. Esch's it swings around on a vertical pivot.

¹ Distance is the horizontal distance from the desk-edge to the front edge of the chair, positive when the chair is behind the vertical, negative when they overlap, nil (Null-distanz) when the edges are one above the other.



There is a whole series of wooden or iron "Pendelsitze"¹ in which the seat swings back on a low pivot.

In this country the individual desk and chair, even as ordinarily made, fully solve the standing problem, and we are relieved from considering the large mass of literature recording the European solutions.

As to height of seat and desk, the modern arrangement for adjustment in a vertical plane, held by set-screws or clamps, entirely supersedes all previous arrangements.



Figure 6. Nil distance. Tendency in writing. Note position of eyes.

to be clamped in place; (b) a slot arrangement — vertical (Miller); (c) a slot arrangement which carries the seat-back up *and back* (Bobrick).

Of these (a) is the simplest and sufficient, for accuracy enough in the height of the upper rest is ensured by varying sizes.

Adjustment of the seat-back for slope is found in some of the French models, and in the Miller chair (figure 8), which also has a spring attachment. It does not appear that these adjustments are necessary, nor is the rocking double back-rest



Figure 5. Nil distance. Back unsupported in balanced sitting position.

Schenk's desk allows for height adjustment ingeniously, but unfortunately the top slides not only down but sharply backward at the same time. Manchain of Geneva devised an adjustment by swinging the top down or up, but unfortunately this changes slope as well, regardless of need for such change.

Foot-rests as an equivalent for adjustment of height of seat need only be condemned as an undesirable makeshift.

Height adjustment of the back-rest has been provided for by (a) a sliding lower rest



Figure 7. Negative distance. Balanced sitting position, with back supported below.

¹ The models of Kaiser, Lickroth, Elsasser, Spohr and Krämer all belong here.

of the modified Miller chair obviously desirable. The slope of the seat is much the same in all modern chairs. In the Miller model a change of slope with change of position is ingeniously provided for by difference in length of legs of the supports on which the chair swings forward and back.

In depth and breadth of seat all recent models conform sufficiently to the rules laid down above.

As to slope of the desk, everything from 45 degrees to 0 degrees is recommended,—the rules that find more general acceptance call for a slope of about 15 degrees. The desks on the market have nearer a 10-degree slope as a rule. A higher slope than 15 degrees would be better for reading, but, simple as the problem is, no desk seems to have been constructed to change this slope as the desk-top slides back.¹ The Parow desk provided for folding back a section for a reading rest, and some of the modern desks provide for a change of level by independent adjustment, but none of them combine a change of slope with the change of distance from reading to writing position.

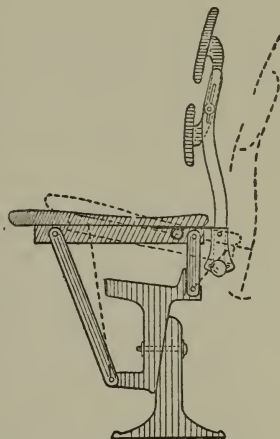


Figure 8. The Miller chair.

Adjustment of distance is perhaps the most important *single* adjustment to be provided for. We have seen that a “positive” or at least a “nil” distance is a necessity for comfortable sitting and reading, and that a “negative” distance is of prime necessity in proper writing.

The methods for attaining this variable distance are :

- (a.) Folding desk top,
Parow.
- (b.) Sliding desk top,
Kunze,
Schenk,
Chandler.
- (c.) Desk top on parallelogram supports,
Schlimp.
- (d.) Seat swinging on vertical pin,
v. Esch.
- (e.) Seat swinging on parallelogram supports,
Hippauf,
Miller.

Only *b*, *c*, and *e* are to be seriously considered; the end desired can be perfectly attained by *c* or by *e*—practically perfectly by *b*.² The choice must be entirely on the basis of con-

¹ The writer has found it perfectly practicable to secure this adjustment by simple devices that can be applied to any desk-lid. The scheme has not yet been tried out, however, save in small models.

² Not perfectly, because the height is not constant, as a sliding top comes down in its original plane.

venience and mechanical perfection. As things stand I know of no models *in the market* save of class *b*.

In conclusion, the absolutely necessary requirements for adjustable furniture are :

- (1.) Adjustment for height — vertically — of chair.
- (2.) Adjustment for height — vertically — of desk.
- (3.) A back rest of proper inclination with an adequate support for the lower back.
- (4.) A proper depth of seat.
- (5.) A proper slope of seat.
- (6.) An adjustment of desk or chair for plus or minus distance. (See foot-note to page 93.)

In regard to special apparatus there is little to be said. The most perfectly worked-out scheme is the modified Miller chair, which provides a seat which has a rocking back-rest, with a spring and an adjustment as to slope. The back swings forward near to a vertical plane, as the seat swings forward to the minus distance, while the seat loses its slope. It is a question if there is any advantage in so close an adjustment to position, and I am not prepared to say that this chair, perfect as it seems, is any better for actual use than some of the models — Chandler, Heusinger, Ideal, or what not, — that accommodate for distance change with a sliding desk-top.

As to the installation of the furniture, the desk and chair should be so set as to allow for three or four inches of minus distance, if both plus and minus distance are allowed for.

As to adjustment, there are obvious disadvantages to adjustment by scale tables. Preferable would be :

- (1.) Adjustment of seat height (measure to under side of bent knee ; set seat a trifle lower).
- (2.) Difference (height from seat to elbow ; set desk [at minus distance adjustment] a trifle higher than this calls for).
- (3.) Set lower back-rest to bear about the last loin vertebra, just below middle of the “small of the back.”

Respectfully submitted,

FREDERIC J. COTTON, M.D.

